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TIFIC QUARTERLY DEALING WITH EXTRASENSORY PERCEPTION, THE PSYCHOKINETIC EFFECT, AND RELATED TOPICS

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The Journal *of* Parapsychology

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WHY NATIONAL DEFENSE OVERLOOKS PARAPSYCHOLOGY

By J. B. Rhine

The gigantic struggle dividing the world today has already gone through various phases and has now entered the stage of an all-out contest in the sciences related to war. Before this phase is ended there may well be such pressures on scientific manpower as in actual wartime forces all able-bodied men into uniform. The present tendency is naturally to become more defense-minded in all scientific endeavor, and this emphasis is likely to increase as the race intensifies.

Workers in parapsychology, on first consideration, might be thought to be immune to this influence, especially since practical application has never been their primary interest. Research in the field has been stimulated largely by its possible significance for a theory of man's nature. Besides that, as a science, parapsychology is still very young, and no branch of science should be expected to have much practical utility in its infancy. And so it will surprise no one that, so far, parapsychology has not had much to do with defense.

Defense, however, is a flexible concept. The rapid change of offensive weapons in modern times is in itself an index of the corresponding evolution of defense. In a single generation we have seen the military engineer make room on the defense team for the chemist, the bacteriologist, the physicist, and even (although he, too, is dealing with a far from mature branch of science) the psychologist.

As a consequence, defense leadership has to face the ever-present question: What next? Against what unforeseen weapons of the future must the nation be prepared? With what still unknown developments will it be able to defend itself?

Defense, then, ideally should be a fluid, sensitive, vigilant, anxiety-laden concept, borrowing from engineering its eagerness to grasp new ideas of possible value, always relying for acceptance on eventual experimental test. Against some such idealized concept of defense the scientist in parapsychology may, in these times, wish to reëxamine his field (or his own work in it) for its potential significance. Such an effort at appraisal in a larger perspective is, in any case, a fitting undertaking for either insiders or outsiders. The remarks that follow may serve to open a discussion of this problem.

The Ideological Contest

Probably in anybody's vocabulary the best defense is prevention. It is here, on this high level, that the usefulness of parapsychology should be examined first. The examination can be made most easily against a background of the familiar past, by reviewing in a fancied but logical way what parapsychology might have accomplished.

Consider the case in the form of the following sequence of appraisals: First, it goes without saying that had Marx and Lenin not developed the ideology of communism, the peace of the world today would hardly be menaced as it is by the communist block of nations. Second, it is safe to say, too, that the communist program presents the world with its dangerous challenge to political freedom because its central philosophy of man and society is one of materialism. Third, it is this view of all human life as physical that has thrown a veil of legitimacy over the impersonal, ruthless handling of people *en masse* as if they were just another form of matter. Fourth, the evidence of psi, showing that its operations defy physical description, experimentally disproves this materialistic theory of man on which communism has been founded. Finally, then, it is logical to think that if the present-day facts of parapsychology had been well known before Marx and Lenin, materialism would have been disqualified in the West as well as in Russia. If, then, communism had not had the powerful support of this materialistic philosophy of

Western science, as it has, civilization would not now be in its present desperate struggle.

Thus, it is reasonable to say that if the facts about man as revealed by parapsychological research had been known earlier, the rise of communism could have been prevented. But we are, of course, living in the present. Unfortunately, the ideological war is by no means over or even well in hand. The battle for men's minds is still the primary contest of today, whatever phase of this desperate global struggle the world may find itself in at the moment. In such a clash of minds we all believe—we must believe—that truth will ultimately triumph. And truth is still a primary human value for mankind everywhere. Of course, then, if communism is based on a false theory of life it will fail in actual practice in the course of time. But the time required for a practical trial would exact a tragic price in human lives and happiness!

Now in other spheres of action science is the trusted appraisor of truth; it saves mankind the costly waste of trial and error. It is the economical substitute for the slow test of practice. By the methods of science parapsychology has conclusively refuted materialism as an adequate philosophy of man. If that fact were to become widely known and sufficiently well understood, the materialistic basis of the communist doctrine would be effectively undermined. Accordingly, man would not need to wait for a century-long practical test of this ideology, since he could in a more intelligent way bring its basic idea to adequate judgment. The cruel and wasteful test of time could surely, to some extent, be spared mankind if and as the negative ruling of science against the materialist basis of communism were sufficiently propagated. Knowledge of the scientific facts would be enough, at least for those who are still free to make a choice.

What could be done from a practical standpoint with a mere scientific discovery? How could the simple fact be made effective, that the basis of communism's claim of what a man is has been disproved? Ideas, let us remember, have often transformed the world, as communism itself still threatens to do. Belief in them can become a powerful instrument indeed. Certainly nothing could be more effective than to prove to the hilt that communism is derived from a mistaken assumption, one so out-dated that no free and informed

scientist could properly accept it. Communists themselves boast of being scientific. Science is the sort of weapon they can best appreciate. Scientific facts, even if at first unwelcome, would better penetrate their armor than any form of propaganda. No institution, for that matter, has ever been able to resist valid science for long, though many have made the attempt.

But whatever the evidence of psi could do if effectively used to expose communism to ridicule in countries it already dominates, it is the defense most needed within countries like our own where the contest for the allegiance of men continues all the time. What other counterweapons exist? There is no physical armament against an erroneous belief. Military power in the long view is powerless if it is defenseless against its enemy's propaganda. The findings of parapsychology, then, could effectively become a "countermissile," both for use at home and abroad.

Is it not strange, then, that this most logical weapon against communism has not as yet been used by the opponents of that system? Thus far no scientific criticism of the communist philosophy has been made; authoritarian attacks, yes, in plenty from pulpit and legislative hall, and from popular articles to political speeches. Economic battles, too, have been waged; and, of course, the force of arms, the traditional first resort in international disagreement, has been our primary defense. But in spite of forty years of strife, the central idea of communist belief, its materialism, has gone unchallenged on the level of scientific scholarship where it rightfully belongs. Yet the assumption that man is a machine has been there all the time, an exposed flank, an Achilles' heel, an invitation to discerning attack.

Now it is precisely on this vulnerable point that the psi researches have had a crucial bearing from the start. Historically, parapsychology began as a reaction to the same nineteenth-century materialism on which communism was founded. It began as a search for a scientific answer to the physicalistic view of man. The fact that the findings of parapsychology and the philosophy of communism are in inescapable conflict has been pointed out, over and over again, and by no one more eloquently than by Dr. S. G. Soal, in his introduction to the *Tenth Myers Memorial Lecture* in 1950 in London.

Logically, then, it would seem that some defense agency should long ago have focused attention on this young science already proffer-

ing the antidote to communism which the free world desperately needs. We are not, as it is, actually winning the war against communism by any other method. Besides that, such an inspection by a defense agency would not have involved commitment, approval, or even appreciable expenditure. It would have required no weakening of other lines of defense.

There might, at the very least, have been an exploratory examination. If the parapsychological branch of enquiry had been found to be too immature, it could, if promising enough, have been assisted to a more advanced and convincing stage. Naturally, before the facts about psi could be of telling value in this war of ideas, they would need amplification through further research, but the basic facts have been discovered; the case has already been made. Only additional emphasis and development are needed. The science of psi has passed through the fire of decades of controversy and is crucible-tested. It rests on the work of many countries and on much independent confirmation. Its best researches were made by standards well above the highest used in general science. They have had to be high in order to meet the criticism within the field itself.

Logical, yes, but for some reason the logic does not register. The evidence of psi does not seem to have reached the Defense mind. Its significance has not yet dawned on the consciousness of statesmen, political leaders, defenders of the free world. Something is lacking. What is it?

Concerning Defense Against Physical Attack

Before answering this question of what is lacking let us broaden further the base on which it rests. Let us consider the relation of parapsychology to another problem of defense, defense against actual attack, against all that potentially "hangs heavy, heavy overhead" above the world today. Has parapsychology any value, present or potential, in defense against the destruction now awaiting the world should only the distorted judgment of a single none-too-benevolent individual decide in a drunken or desperate moment to give the signal?

For the answer, look first at the military facts: modern war, even more than ever before, hinges mainly upon secrecy and surprise. If these two dangers could be banished, a long lease on world peace could be gained from that action alone. Even if there were only a

reasonably promising prospect of developing a means of abolishing surprise attacks, it should be a prospect of the greatest conceivable importance. Every effort should, of course, be made to accelerate any research that might hold out a hope of such an effective instrument of defense.

Let us now turn to the relevant facts about psi. First, ESP is an actual human ability. Second, thus far ESP has been found to operate independently of the types of physical barriers that affect sensory perception. Third, while the actual operation of ESP upon demand is as yet uncertain and unpredictable, nevertheless, under exceptionally favorable conditions a great deal of information has sometimes been conveyed. For example, knowledge of the order of twenty-five concealed cards has many times been demonstrated in an unbroken series of successes. Fourth, like all natural processes, ESP shows lawful principles of operation which, when more fully discovered and understood, should permit more controlled and efficient use of the function than is at present possible. These are the elementary scientific findings concerning ESP as a natural process.

But, Defense would ask, can ESP function on the type of information vital to defense? The answer is that thus far no limitation in the range of the target material susceptible to extrasensory perception has been found. It ranges from thoughts to things, big things to little, animate or not, distant or nearby. The process, moreover, definitely has a voluntary character and can be purposefully directed. The only limitation about which we can now be sure is that *the process operates on an unconscious level.* While many important relationships have been found between ESP and the conditions affecting its functioning, psi has not yet been brought under conscious control. A considerably greater degree of control than is now obtainable would be required to apply the capacity reliably to practical problems. There the matter stands, awaiting further research before claims of usefulness are in order.

Where does that leave us, then, with respect to the prospect of using psi capacity in the interest of defense? It leaves ESP resembling a bridge of many spans, one of which is missing; and the missing span is the reliable control of ESP. This control might be acquired by inducing ESP to operate consciously or by developing a way of influencing it on its own unconscious level. It would

be impossible, of course, to say just when and by what particular discovery this missing span may be supplied, but such uncertainty of the rate and course of progress is typical of growing sciences. Accordingly, it takes little optimism to anticipate that the knowledge necessary for completion of the bridge should be obtainable if the proper effort were put into getting it.

Why, then, does Defense not turn its attention to bringing this missing span into place? Time after time in the history of modern defense developments our country has been faced with just such a possibility—often, indeed, with a much longer span to complete and greater reason for uncertainty as to the outcome. When the decision was made to risk billions on the great Manhattan Project, was it known for a certainty that a practical, usable atomic bomb could be made within a given time? Certainly not. Most, indeed, of the great novel and daring developments of the times are at some stage basic, problematic researches. Later they become clear experimental probabilities, and, finally, acceptable realities.

Would it not be logical to think, then, that there would long since have been defense officials looking over the shoulders of research workers in parapsychology, watching for progress toward the control of the one known human capacity that could abolish the menace of secrecy and defeat the surprise attack before it was begun? Would it not be reasonable to expect that workers in the field would be pressed to accelerate their investigations and to find out what inhibits the functioning of psi? If an individual in an experiment can, under well-controlled conditions, occasionally produce a significantly high ESP score, thereby getting information from behind barriers that no known instrument of defense has been able to penetrate, what could come closer to the long-range intelligence that Defense devoutly desires?

Logical, yes. Reasonable, obviously. But actually nothing like this has happened. What, then, is so wrong that reason means so little? What irrational barrier is it that renders logic impotent? Here, indeed, is one of the phenomenal aspects of modern scientific thought, that there should be, seemingly within reasonable reach of the defense system of our country, something which logically seems to hold the prospect of eliminating secrecy and surprise in modern war. Yet Defense could not conceivably appear more indifferent to,

or less aware of, the existence of the manifest possibility before it. Today it could even perfectly well be that in some quiet laboratory in some corner of the world the gap in the bridge is actually being closed, without Defense officials being aware of it, in spite of all their anxious stress on science and its role in the nation's critical struggle.

The student whose conception of science is an idealized one gleaned from academic studies might expect that some branch of Defense intelligence would itself have developed a research program in parapsychology to push the explorations to the limit, trying to gain for its country the enormous advantage of a technique independent of physical barriers. But if anything of the kind has occurred it is shrouded in utter secrecy. Workers in parapsychology continue to go their comparatively rugged way with limited aid, struggling with difficulties which the cost of one experimental bomber would remove for a full lifetime of research. Something, indeed, is lacking. Let us see if it is something that can be discovered and understood.

Why Parapsychology Is Disqualified

Let these examples of possible usefulness of parapsychology in defense serve to focus the question: What is wrong that such obviously significant scientific findings mean so little to a science-conscious Defense?

First of all, it might seem to be just a matter of normal healthy skepticism such as every new claim encounters. Of the "skepticism" there can be no doubt; but it seems safe to say that it is not "normal and healthy"; it has persisted too long after the questions have been answered. It has, for instance, lasted nearly a quarter century after such research as the Pearce-Pratt Series of ESP tests was completed and published. This skepticism has persisted, too, in the face of pressing need for the principle in question. For example, during the recent great war, this country cast far and wide a sweeping dragnet for ideas useful in defense, examining even the utterly fantastic. Yet the scope of inquiry did not extend to the evidence of ESP. Healthy skepticism would give way in the hour of need. Normal doubt would yield eventually to repeated demonstration, however dubious the new claim might at first appear.

Another factor to be considered is philosophical bias. As already stated, parapsychology refutes materialism as a philosophy of man simply by proving that there is something nonphysical about him.

From time to time critics have frankly said they reject ESP because of this conflict with materialism. It is true, the physicalistic view of man, in one form or another, has largely taken over Western science, very much as in an earlier day supernaturalism provided a general philosophy of all nature. This devotion to a concept which equates nature with physics is beyond question a large factor in making the acceptance of parapsychology slow. But it would require more than this adherence to a prevailing philosophy to hold Defense back from an interest in psi. Defense is practical not philosophical. Its officials would quickly say, "If your device will do the job, we do not care what your theory of it is."

Many will say Defense is just too timid to take on so mystical and occult a claim as the application of psi might appear to be. The phoney associations that clutter up the public conception of the field of parapsychology doubtless are a serious deterrent to many. It is true that now, as a result of parapsychology's progress, an increasing number of imitators, poachers, and camp-followers, sponge off the interest created by responsible (now mostly university) investigations. Dramatic blindfold stunts impress, at least for a time, even many good scientists unfamiliar with such trickery. A stage "telepathist" may actually convert with his magic some of the "hard-headed" psychologists who have been left unmoved by the experimental research (especially if they have not read the reports). Smooth charlatans equipped with a pseudo-scientific jargon and a laboratory full of electronic claptrap may succeed in milking off large funds from gullible, even though ever-so-well meaning, donors. But could all this surrounding malodorous cloud of unsavory associations so obscure the reliable investigations that the whole field would seem to Defense hardly worth investigating? No. If there were known to be genuine value embedded in any amount of worthless trash, no lack of courage would keep Defense from finding its way to the important truth in the pile. It would take a bold decision, yes, but the decision could be made so quietly that the aspect of ridicule would be at least long postponed; and before such a factor could become important, Defense would have justification for its actions.

Still another proposed explanation of this blockage has been offered by men who know the world in which Defense moves and operates. It is, they say, just a matter of time; when parapsychology

has reached a stage at which definite commitments can with reasonable assurance be made within specified time limitations, Defense will be interested. They say parapsychology is not yet ready for Defense. This, at least, is the way these advisors see the matter; but it is not really the way Defense sees it. We need only look back over the many long-term defense projects actually under development, over crash programs on which long-view planning has been undertaken, with no guarantees of timing. Most of them, too, cost enough in a single week to finance a crash program in parapsychology for ten years. There is, we grant, a *grain* of truth in this point, as, indeed, there is in all the "explanations" reviewed. But no one of them, nor all of them together, are enough to account for the utter disregard of the contribution parapsychology could make to Defense.

Yet what reason remains to account for the indifference?

American Education for Conformity

There remains one gravely important reason for this indifference: the effective block seems to be a natural defensive reaction of minds untrained to entertain a truly new and unconventional idea. It is not necessarily a fear; it is more an embarrassed resistance to a strange concept, a hesitancy that springs from not knowing how to deal with the unorthodox. The reaction is one of conservatism, which is likely to remain even when all definite questions have been answered. The tenacity of this conservatism is shown by the fact that, all through the years, although the critics of parapsychology have been answered and silenced, they have not thereby been won over even to openmindedness. Their criticisms, it would thus appear, must have been only a defense to cover this blind uncertainty as to how to accommodate to the novel conclusion.

Those who do not know how to handle a new claim must, of course, remain intellectually on guard against it. This reaction is natural. On account of it, some will be timid and cautious and some may manifest indifference, while others will show aggression toward the disturbing new idea. But all who are mentally unprepared to meet it with the confidence and intelligence of a qualified scholar are likely to refuse, in one way or another, to have any effective commerce with it.

Why should an irrational incapacity to deal with a radically new

claim be so general? The answer would almost necessarily have to be sought in the system of education. Something is evidently missing there. The development of minds prepared to meet and welcome really strange discoveries has been neglected. Where, one may ask, in the entire school system is the student educated to deal with unorthodox and even revolutionary ideas? Instead are we not as a nation left comparatively unprepared to deal judiciously with the current challenges to which we are continually exposed: to claims of flying saucers, dianetics, Bridey Murphy, Spiritualism, astrology, "snake-handlers," faith healing, hypnotism, psychokinesis, psychoanalysis, water divining, numerology, communism, phrenology, dietary fads, political nostrums, religious cults, and so on and on? The fact is, the student of the sciences in the U.S. today is trained (as contrasted with educated) to become a "good" (orthodox) botanist or chemist or psychologist or nurse or engineer. He learns the techniques of his branch of inquiry, and he is taught to square new claims in his field with the old. The old thus becomes the sole criterion. The new must always fight an up-hill battle for acceptance. Thus a student's schooling does not enable him or encourage him to become a true explorer in a larger sense. It does not teach him to look for and cope with strange hypotheses which may require a higher test of truth than that of consistency with the already known. Thus unprepared, he may be advanced to positions where decisions must be made on revolutionary concepts and issues. If so, the supposedly educated administrator will be driven in self-defense to a guarded negativism toward all the strange, unfamiliar ideas he may be forced to pass upon.

It would follow, then, that America would have to import its bolder, more revolutionary theoretical ideas from other countries. We should expect that in a country dominated by scientific "trainees," with a culture strongly given to mass conformity within professional groups and in science departments within the university, there would be a high degree of blockage to the consideration of radically new ideas. It is not surprising, therefore, to hear Dr. A. H. Maslow, Brandeis University psychologist, ask in his Cooper Union address of March, 1956: "Why is it that there has never been a great creative American psychologist? . . . Why is American science so essentially conventional, so hostile to creativeness, to unortho-

doxy, to new ideas?" And so it is. Workers in parapsychology who have crossed the Atlantic to discuss findings in their field in countries of western Europe, find the contrast of the two hemispheres in matters of tolerance distinctive. In the realm of basic research ideas, to go abroad is like stepping a decade or two into the future (even though one is happy to return to American philanthropy and the American university for research opportunities not found elsewhere). The reason seems to be just this: American scientists too often do not know how to test and interpret new ideas, or how to find out on which shelf of nature's closet to put them. Consequently this lack of preparation to cope with a radical discovery develops a stilted, inhibited shyness toward unorthodox findings. Unfortunately, the reaction of Defense is only a typical example of the way this conservatism operates toward discoveries of parapsychology or of any other science. It is a human trait and one that, especially in the United States, has all too well escaped the corrective influence of education.

The Prospect for Parapsychology

If the above analysis is correct, parapsychologists may as well resign themselves to a long wait before they can expect to be assigned a role in the present science-for-defense drama. But none will be discouraged by the delay. Experience has tempered the expectation of workers in this field. Even if a more tolerant attitude gradually should develop, that alone would not be enough, as the status of parapsychology in relation to Defense in Europe illustrates. Tolerance is but one of many of the requirements of a flourishing, advancing scientific culture.

Fortunately we in American parapsychology shall not wait idly. Happily, also, a certain slow but steady progress in the scientific recognition of the findings of the field can be discerned. Quite possibly too a break-through may be made or some means discovered of so controlling the psi function as to make practical application possible. Even more important is the step-by-step progress being made in relating the psi findings to other areas of science. It now appears safe to say, then, that we can count on the research breaking down the prevailing resistance in the course of time. (How much time it may require and how much may be given can only be decided by world events.)

Other grounds for optimism exist, too, limited and uncertain though they be. The closer international exchange now anticipated among scientists should bring to this country more of the free spirit of inquiry some European countries have cultivated better than we have. Also, the present intensification of the national interest in the achievements of science may be expected to help in bringing to the leadership of the country increasing numbers of those who better represent creative American science as distinguished from those who are merely trained specialists.

Above all, we may hope the current stir about scientific education in the schools, while beginning with a superficial emphasis on numbers, will develop an even greater stress on ability. Mere numbers of scientists of low competence would add little to the defense of any country. Naturally, if the emphasis becomes a balanced one and we become concerned with quality as well as quantity, we may reasonably anticipate improvement not only in efficiency of training but in basic scientific understanding as well. We may hope that then the young scientists of America will be educated to appreciate and properly handle such strange and unconventional hypotheses as make up the more creative elements of science.

The real challenge to American education, then, is not merely to match the Russians in the training of scientists. It is a much more difficult undertaking, that of catching up with our own highest ideal of what scientific attitude and understanding should be. We must ask our educational system to prepare young scientists for the making of truly original discoveries and for meeting even the radically new and unanticipated unknowns an unhampered science presents. The scientists thus educated will know what to do when confronted with whatever novelty. They will know what questions to ask first; what hypotheses to consider; how to weigh and test these trial answers or hypotheses until a choice can be made; above all, how to suspend judgment, resisting both hasty acceptance and rejection until the evidence is adequate for one or the other; and, finally, how to draw valid conclusions from evidence. If they do know all this, we may be reasonably sure they will be fascinated instead of repelled by the new, the unknown, and the unexpected as they come upon them in their inquiries or in the work of their fellows.

If we in America can equip students to handle the challenge of

genuinely revolutionary phenomena of nature, phenomena as unorthodox as those of psi, instead of blindly avoiding all the evidence of them, we shall not need to worry long about the status of the sciences in other countries. Even on the secondary aspect of numbers of scientists, we may be confident that with the development of a more free and venturesome spirit of scientific inquiry, science will draw more than its share of candidates as the novelty of expanding discovery enlivens student interest. The quality of scientific leadership itself, in whatever department of application, will come to represent the spirit of science at its best. New fields, even those as eccentric as parapsychology, will no longer need to spend wasteful decades merely waiting for the opposition to die out by dying off. Revolutionary discoveries will be welcomed instead of harrassed, fostered rather than starved. Defense will lack for nothing the potential of science can contribute. Together they may yet achieve the ideal defense itself—prevention.

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SPACE, TIME, AND CONSCIOUSNESS

By J. M. J. Kooy[1]

THE PHENOMENON of precognition is interwoven with the space-time problem and is therefore of the utmost importance.

As soon as we start to think about the real essence of precognition, we have to realize that our common conceptions of time and space are completely useless. According to the generally accepted point of view, a man's consciousness at any moment has to be regarded as a function (in the mathematical sense of the word) of the simultaneous, instantaneous state of the brain. Because this brain was influenced in the past, the possibility arises that sensory impressions have left behind their traces in the brain matter, and in this way it seems possible that a physiological basis of memory is built up. But in precognition we are confronted with the strange phenomenon that a man's consciousness can contain knowledge of future events, details of which could not have been deduced by any known logical method. Yet the facts of precognition do not exclude the possibility that by some higher process of reasoning of which we are unconscious, these details are still inferred from known past events. The human brain cannot, by its own activity, judge its complete activity, just as we cannot overtake our own shadow.

However, there is another and quite fundamental reason to believe that the ultimate truth has to be looked for elsewhere. We have to realize the fact that as soon as the conception of *time* comes into play, this time is and will always be *physical time*, always and everywhere measured by clocks, that is to say by cyclic physical systems. For even if we claim to have experienced a whole lifetime in a dream of one minute, this minute must ultimately be measured by physical means. This basic conception implies that all such terms as "psychological time," etc. introduce an element of confusion into the problem, and in reality have no objective meaning. Hence, it is inevitable that the space-time interdependences discovered to be valid for the purely physical world have to be considered as having

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their fundamental significance for all problems of life—and in the very first place for the problem of precognition.

In view of the above we have to start by posing the question: Does an absolute physical time exist, which corresponds with an absolute Now? The answer is undoubtedly: No, there is no absolute time; no absolute time-interval exists between two events, no absolute simultaneity and also no criterion for an absolute Now in the external world. Furthermore, there is not only no absolute time-lapse between events but also no absolute space-interval between the points where the events in question take place. Both time and space quantities appear to depend on the state of motion of the observer. There is also no criterion by which one observer could be preferred to another; all observers are to be considered equivalent. It is an established fact (ascertained by pure physical measurement and not by vague philosophical considerations) that neither spatial distance nor distance in time is the same for all observers. Obviously distance in space by itself and distance in time by itself are not absolutely independent quantities. On the other hand, it appears that another quantity, *the space-time interval*, playing the part of "distance" in a manifold composed of space *and* time has a more fundamental meaning in nature, being the same for all observers. This too has been established by pure physical observation.

In other words, it appears that the physical world (embracing the physical perceptions of all observers) is a world not only extending in space but also in time. It is not a world constituted of instantaneous objects, having instantaneous positions in an absolute advancing Now (towards a future), but a world constituted of events embracing past, present, and future. Such a world is neither dynamic nor static, for these terms make sense only when referring to the common-sense view of a world where time and space are regarded as separate entities. In a space-time world (in which space and time are fused together forming a manifold which is neither space nor time) it is only possible to speak of a *state of being*. In trying to describe such a space-time world we should avoid using words denoting a "flowing time," for in reference to such a world the word "motion" as well as the word "rest" are equally senseless.

Some readers may object to the "image" of the world conceived

as a space-time manifold, in which events are situated in a way analogous to that in which the material objects are situated in space, and he may well say that such a conception is only a working hypothesis, in order to describe certain physical interdependences of phenomena observed.

However, it should not be lost sight of that the common-sense view also is a working hypothesis which is in fact inferior to the conception of the space-time manifold, because only the latter conception is a fairly complete synthesis of all perceptions of all observers involved. Further it must be stressed that by the space-time manifold conception new physical interdependences are predicted and confirmed.

Turning to the problem of interdependence of brain state and thought, it will be obvious that our viewpoint is completely altered if we base it on the interrelations of space and time, geometrically represented by the conception of the space-time manifold.

First we must realize that the "brain," although part of a living organism, is nevertheless a material object, so that from a wider point of view we may regard it as a four-dimensional brain substratum, not only extending in space but also in time. This four-dimensional brain substratum is to be considered identical with all events constituting the whole life of the brain, from birth to death. Looked at from this viewpoint there can be no question of birth and death in an absolute sense, but only of a certain extension in space-time, bounded by birth and death. This means that the old view that a man's consciousness is a function of the instantaneous brain state has to be replaced by the broader view that *this consciousness is a function (in the mathematical sense) of the four-dimensional cerebral structure.* Hence, this consciousness has *no time-coördinate at all.* The idea of a man's instantaneous consciousness is of some significance only when conceived of as related to an instantaneous brain state. The latter only refers to the common-sense point of view which is now superseded by the space-time manifold conception.

It is obvious that the impression we all have of a "flow of time" and a corresponding shifting "Absolute Now" must be immanent in our perceptions themselves. How can this illusion arise? The

problem here is one of a psychological nature, and only a provisional indication towards a solution can be given.

It seems that any one perception has, with respect to all other perceptions, the "timbre" *now*, so that with respect to *any one* perception all other perceptions are past or future. We have also to bear in mind that no perception has an absolute time-coördinate. If it has any time-coördinate at all, this only refers to its relation with other perceptions. In this respect we can say that any one perception is linked with all other perceptions.

It is quite evident that this conception is logically unassailable. One may raise the objection: If one perception is conceived to happen now, how can another perception be now at the same time? Are we then ultimately to regard all perceptions as happening at the same time? The answer is that there can be no question of "happening at the same time," because there exists no flow of time at all but only a state of being. In this state of being any one perception translates by its "now hall-mark" any other perception into "past" or "future." It is like an army in which any soldier regards himself as the general-in-chief. It need not surprise us that here we are confronted with an illogical mental structure; illusions are not kept within bounds by logical order.

The way our consciousness is built up will make it clear how the illusion of a common absolute "now" embracing all mankind can arise. If a person A perceives a person B, this "perception B" of A possesses the "now hall-mark." But in exactly the same way the perception of B "seeing A" has the "now hall-mark" too. From this it follows that A and B experience the mutual perception "to be at the same moment."

Closely associated with the illusion of time flow is the so-called "arrow of time." What is the essential (objective) difference between past and future? From a purely physical point of view no criterion exists for distinguishing an absolute "now" in the external physical world. But as to "earlier" and "later," "past" and "future" *with respect to a certain event*, there is a distinguishing feature which could perhaps be used for this purpose. This is the general tendency in nature for energy to be dissipated, the tendency to a gradual transmutation of order into disorder. This tendency is expressed in mathematical terms by the so-called *entropy gradient*.

We have to look for the same tendency as regards the brain. There are, beyond any doubt, cyclic processes going on in the brain cells, a continual transition of order into disorder occurs owing to the secretion products. During sleep a partial recovery seems to take place. Now, just because this internal cerebral clock is a bad clock, it gives us the impression of "becoming." Hence, from the space-time point of view we can only say that in connection with the cerebral substratum a certain statistical quantity, expressing the degree of disorder, varies. A part of this substratum, in which this disorder is larger than in another part, is perceived as "the later brain state." This impression of a "flow of time," *based on the structure of our brain substratum,* is projected by us into the external world.

Further, it should be clearly understood that we can only speak about *cause and effect* if we accept space and time as two separate and independent entities. In the space-time world, in which past, present, and future belong to the same level of reality, there can be no question of forces and reactions of forces but only of a being of events. On the other hand, it will be obvious that the principle of cause and effect must have some meaning in this objective world—that is to say, some four-dimensional counterpart. In order to illustrate this counterpart more clearly, the following analogy could be advanced.

It is a known fact that in most countries signposts are placed along the railroad tracks, and that in the direction of travel a small signpost is placed at a certain distance before a large signpost. According as the large signpost is in the position "free" or "blocked up," the small post will also be in similar position. By this arrangement the locomotive engineer, passing the small signpost, can take his measures in time before reaching the large signpost. Now let us assume that our locomotive engineer, traveling with his engine through the fog, is a little light-headed and believes that signposts and other indications along the railroad track, emerging out of the fog, do not exist all the time but come into being, are created in an absolute sense. Observing that a large signpost always presents itself after the emergence of a small one, he concludes that the emergence of a small signpost always *causes* the creation of a large signpost. But *we* know that there is no question whatever of "creation

of signposts" but only of a special arrangement of signposts along the railroad track. Nevertheless, the peculiar conception of the engineer has practical value for him, for as soon as a small signpost emerges, he knows that unfailingly a large signpost is created, and so his attention is concentrated.

In the same way our conceptions of cause and effect, and the corresponding ideas of speed, acceleration, mass and force, all inseparably connected with the subjective splitting-up of the four-dimensional world in space *and* time, are of great practical importance *to us,* and correspond with chains of events in the objective world analogous to the arrangement of signposts along the railway track. Thus, from the four-dimensional point of view there can be no question of causality; only the arrangement (or some of the arrangements) in this world may be such that this appears as causality *to us* from our point of view of an instantaneous world, developing in time.

It is, moreover, of great importance to realize that a "body in itself" is a product of mere mind-spinning, not belonging to the real world of events, which is extended in space-time. What we call a "body" is only a kind of permanence perceived by us in the "course of events." In a similar way in quantum mechanics, an atom in a definite state of energy, or an electron by itself must be considered only as a metaphor.

Looked at from this viewpoint there is no fundamental difference between the motion of a "hole" or the motion of an electron in a semi-conductor. In both cases there is no hole by itself and no electron by itself. Only the indivisible entities "hole motion" and "electron motion" may ultimately have some meaning. In view of what has been said, there is nothing odd in the conception that "matter" as well as "light" shows both aspects of "waves" and "corpuscles," which in fact should exclude one another. There is also no sense in saying that "matter" is only "bottled energy," for energy is nothing but the possibility of matter doing work on other matter. Therefore, the idea of transformation of all matter into energy is a *contradictio in terminis.*

However, all these incongruities disappear as soon as "matter" is replaced by "action," the basic material of becoming, of events.

Looked at in a similar way, it will be clear that there cannot

be an instantaneous brain, the physical base of instantaneous consciousness. Only *cerebral events* exist which may be the physiological counterpart of consciousness.

Let us now examine the far-reaching consequences of this view by considering the simple case of an old man pondering over an event which happened in his youth. Let us suppose that the memory images are so vivid, so overwhelming that he loses contact with his material surroundings. We can now in all seriousness put the question: Does it make better sense to claim that he is in the past? The question posed in this way really has the same meaning as asking if the old man is thinking *with his brain of the past* or only with his brain of the present.

Now the whole complex situation of memory can, according to the conceptions advanced, be regarded as corresponding physiologically with: (1) cerebral events belonging to remembered past perceptions; and (2) cerebral events at the time of remembrance.

The complex situation of memory, *as a whole*, corresponds with the complex of cerebral events embracing (1) and (2) as a whole; a division into separate parts is in principle out of the question.

There is thus no question of any time-interval as regards the whole remembrance-complex by itself; it is neither the lapse of time within the remembered event itself, nor the time-lapse of the remembrance itself (speaking in conventional terms), or any time-lapse between the time of the event and the time of remembering it.

There is also no reason to advance the extravagant idea that the memory complex as a mental complex by itself is to be regarded as developing in some other time-dimension, whatever that may be. All that can be said in this respect is that the physiological base of that complex is composed of parts of the four-dimensional brain substratum, which are scattered in space *and* time.

Further, it only depends on the subtle "timbre" of the whole complex whether it includes a paranormal aspect, or whether it only belongs to the range of what in psychical research is named the normal.

It may be that the old man (who in a nontemporal sense is also the boy) only partially loses sensorial contact with his material surroundings during the vivid and overwhelming memory image, so that there is still some background of the "present" existing for him.

Then the following subtle variations of interdependence of cerebral events and mental complexes may be possible:

1. The person in question has *only as an old man* (during the vivid memory images) a vague impression of the background of the present.

2. The person in question has not as an old man, but *only as a boy* (during the perception of the event), the vague impression of the background of *the present in his old age.*

3. The person in question has *not only as an old man but also as a boy* (during the perception of the event) the vague impression of the background of the present in his old age.

In Case 1 we are fully within the range of the normal, though the brain state of old age is also engaged throughout the perception in remembering the youth event.

In Case 2 we come in contact with a precognitive vision of some future situation of the boy's old age, simultaneous with the boy's perception of the event. Throughout the remembrance of the event in old age the brain state is also perceptionally engaged in the precognitive vision during youth; this perception, however, does not rise above the level of consciousness in old age. That is the reason why in this case the precognitive vision is not recognized in later days as precognitive. Erroneously it will then be considered as the result of "pure imagination." It is quite possible that many precognitive impressions are not recognized as such.

In Case 3 we find ourselves completely in the parapsychical. Looking at it from the common-sense point of view; i.e., that of space and time as separate entities, we can try to approach the problem from two sides. If we approach it from the viewpoint of the boy's experience (during the perception of the event), it can be looked upon as a precognitive vision which is recognized as such (and thereby observed) in old age. From the viewpoint of the man in old age, however, it is the memory of a perception during his youth, together with the "realization" of the precognitive vision during youth. Both points of view are equally true and represent the same fundamental mental complex outside time, looked at from different angles.

It is quite probable that cases of Type 2, which are only *latently precognitive,* are frequent in comparison to cases of Type 3 which are

manifestly precognitive. Introspective study of precognitive elements in dreams shows that such elements are often overlooked and are not recognized as such, but are only discovered and recognized as "precognitive" by reading over the dream records again later on. Mr. Dunne in his book *An Experiment with Time* emphasizes this feature which my own introspective studies of my dreams as regards the occurrence of precognitive data have fully confirmed. I therefore believe that it is of importance to invent a method to bring cases of Type 2 within the range of observation, in order to study more closely their frequency as compared with that of the cases of Type 3.

For that purpose it is necessary that the underlying cerebral processes should be observed as directly as possible. This could be done by continuous control of the "brain waves," periodical changes of electrical potential between certain points of the brain cortex which change in aspect in case of emotional impressions. These "brain waves" can be made visible on a screen by means of electronics.

In principle we could proceed in the following way. We should first collect a large number of "dreaming subjects" (or subjects liable to paranormal impressions). One of these subjects must undergo a strong emotional experience—after dreaming—but at the time of dreaming no one is to know which subject will be selected. This has to be decided by some random procedure. In the meantime, during dreaming and also after dreaming, the brain waves of all the subjects must continually be electronically registered. It seems probable that the subject who is later to undergo a strong emotional experience will have a pre-reaction in his dream, recognizable by a peculiar change in brain-wave pattern. The brain-wave pattern must also be studied at the time of the emotional experience.

Although such a program of research may seem fantastic at first sight, it is nevertheless quite possible to carry it out. There is no doubt, I think, that it is possible to *cause* a premonitory dream-impression by influencing the subject after the dream. I myself succeeded in consciously provoking a premonitory impression in such a way, while at the time of the precognitive impression the possible choice of the subject was unknown and could be regarded as purely random. (I suddenly showed the subject a sword hidden in a walking stick.)

It will further be obvious that in the program of research indicated above, the "dreaming subjects" need not be only human beings. Dogs also could be used as subjects, as these probably also will have precognitive impressions.

It is evident that cases of Type 3, too, may be studied. In such cases the brain-wave disturbances may also occur during sleep, while the later pre-effecting impression remains unconscious. It is to be expected that this type of "premonition" is most frequent.

Another important point is the following: According to the considerations advanced above, a memory complex has its physiological base in a complex $\alpha\beta$ of the brain substratum, of which α corresponds with the perception of the event and β with the remembrance of it. If β is disturbed, $\alpha\beta$ is also disturbed. Hence, despite the fact that in remembering, the person in question partially "thinks" with his brain of the past, the condition of his brain in the present time is also an essential factor of the whole. If β is disturbed, then the remembrance also is disturbed.

The following interesting point, too, is open to statistical research. If a person should have in the future a considerable (or the whole) part of the brain substratum disturbed (for instance, owing to some disease of the brain), so that the corresponding future perceptions are disturbed, it is to be expected that also premonitory visions, at least of Type 3, corresponding to the disturbed part of the brain substratum, will be suppressed.

So far we have only taken into consideration the purely individual aspect of the body-mind relationship. The principle point we have advanced in this connection is that a person not only "thinks" with his brain of the present but also with his brain of the past and the future.

In telepathic contact, however, in which displacements in time, either toward the past or toward the future, may also occur, we meet the strange phenomenon that one person—at least partially so—may think with the past, present, or future brain of some other individual. This fact opens up an overwhelming range of new possibilities and is of the utmost importance in relation to our view of man and the Cosmos. It sweeps away, to some extent at least, the distinctions existing between the living, the dead, and the not-yet-born, reducing the traditional differences to something subjective

only. It further shows that problems concerned with life before birth and life after death are only pseudo-problems.

In order to show this clearly in simple terms, let us consider the following case.

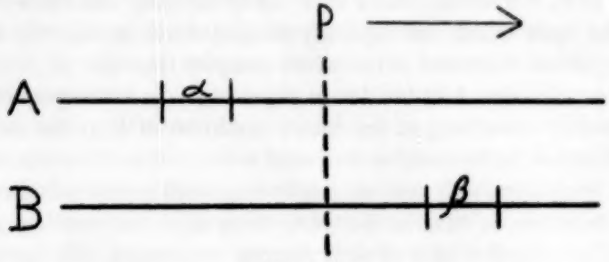

Figure 1

In Figure 1 the two parallel lines represent in geometrical terms the brain substrata of two persons, A and B, the arrow representing the "arrow of time." Let A have a dream, corresponding physiologically with the part α of his brain substratum. Let us assume that in this dream, A appears to B, *in the future*. Let us further suppose that B, in a kind of internal vision, perceives A, and that β be the part of B's brain substratum physiologically corresponding with this internal perception. If A is still alive at the time of β, we are confronted with a *phantasm of the living*. The total mental complex, including the perceptions of A and B *as a whole*, must then be considered as physiologically corresponding with the cerebral complex αβ *as a whole*. Speaking in Tyrrell's terms, we have hereby to do with the mid-level "AB," which is neither A nor B, but of which A and B are to be considered as the indispensable, inseparable components.

If we now assume that A *dies* at the point P (see Figure 1) so that β corresponds with a time after the death of A, we are confronted with a phantasm of the dead, all other features remaining the same. From this it follows that there is no fundamental difference between a "phantasm of the living" and a "phantasm of the dead." In the latter case, it is not simply a matter of A presenting himself as an object to B, nor does B merely have an internally initiated vision in which he seems to perceive A, but A and B both contribute their indispensable and inseparable share. If we approach it from

the traditional spiritualistic point of view, we may indeed say that A is engaged personally in the matter—despite his death—but also that B plays an indispensable part too. We find ourselves here fully in the mid-level range "AB," for which "death" as an excluding factor does not exist. Now this whole complex can show various features upon which the explicitly parapsychical or the only latently parapsychical character of the whole complex depends.

It may be that A in his dream physiologically corresponding with α, perceives something of the future condition of B at the time of β, which cannot be foreseen in a normal way. From A's point of view it is a premonitory dream, corresponding with a post mortem event. This, however, is exactly the same thing as *a post mortem perception of A*. Such a case of post mortem perception (life beyond the grave) which is at the same time a premonitory vision of an event after death, is fully open to observational methods, and *would prove the possibility of post mortem perception beyond a doubt.*

It is also possible that A in his dream physiologically corresponding with α, informs B about something which at the time of β could not have been known to B in a normal way, while B, in his internal vision or perception physiologically depending upon β, is correspondingly informed. In such a case we are confronted with a contact between A and B which seems to B to be a communication with a surviving A and in which B gets some information from A. Such a case by itself, however, can never "prove" conclusively the intervention of the dead A in B's life because the objection can always be raised, whether B in some way or other (normally or parapsychically) could not have had access to the information in question. However, in combination with the first case, the acceptance of such a post mortem communication would be rationally possible.

We can also assume that in Figure 1, P indicates *the birth* of B, all the other features remaining the same. Then, in the dream of A corresponding with α, B, *who is not yet born* from A's point of view, appears, and B's apparition in the dream can inform A about B's future life (though yet unborn). B, in his turn, may have a dream corresponding with β, in which he gives information to A. In such a case, which would also be open to experimental research, we are faced (if we look at it from A's point of view) with a *phantasm of one not yet born.* From B's point of view the dream, cor-

responding with β, may contain parapsychically received information about A who may be alive or dead at the time of β. In this manner, communication of the dead with the not-yet-born (from a point of view intermediate between the times of α and β) becomes a possibility and is also open to experimental investigation.

The possibility of mental interdependences beyond time need not be limited to just two persons but may be increased to include an indefinite number. In this way it is in principle possible to account for collective apparitions.

The cases formulated above may sound fantastic. Nevertheless, they are fully within the range of the parapsychical as known today. However, the study of such interdependences has been rather neglected up to the present on account of the traditional (but no longer tenable) philosophical viewpoint of the existence of a separate and independent space and time. In my opinion, in future research the reciprocal relations between the interdependent internal visions, perceptions, etc., scattered in individual and superindividual ways throughout space-time should be thoroughly investigated. I expect that in some rare cases of an "apparition of the dead" such reciprocal dreams as postulated above may then be discovered, corresponding with the later vision of the appearance. But I also expect that in the majority of cases the reciprocal corresponding premonitory dream or vision during the lifetime of the person in question will remain unobserved.

Only by investigating with the greatest perserverance may we hope eventually to disclose slightly more of the underlying mental world in which space and time are not absolute barriers and to establish the concordance of this world with the universe—the world of physical events.

APPENDIX

For readers acquainted with mathematical symbolism we can briefly formulate the general line of thought indicated above as follows:

Let $F\ (x, y, z, t)$, in which x, y and z are space coördinates and t a (cosmic) time coördinate, indicate the action density at any point x, y, z, t of space-time. Then in principal always a function

$$\Psi\ (x, y, z, t, x', y', z', t')$$

in which x', y', z', t' denotes any other point of space-time, can be determined in such a way that:

$$(1) \qquad F(x, y, z, t) = \int \Psi(x, y, z, t, x', y', z', t') \, F(x', y', z', t') \sqrt{g'} \, dx' \, dy' \, dz' \, dt'$$

in which the integral must be extended through all space-time, which may be curved and closed. In the integral the factor $\sqrt{g'}$ depends on x', y', z', t', defining the metric structure of space-time. This metric structure may again depend on $F(x, y, z, t)$. The equation (1) then expresses the interdependence of any event with all other events throughout space-time, and can in principle also be applied to parapsychological interdependences. Integrating (1) throughout the space-time region of a cerebral substratum, we obtain:

$$(2) \qquad \int_{CS} F(x, y, z, t) \sqrt{g} \, dx \, dy \, dz \, dt = \int_{CS} \sqrt{g} \, dx \, dy \, dz \, dt \int_{ST} \Psi(x, y, z, t, x', y', z', t') \, F(x', y', z', t') \sqrt{g'} \, dx' \, dy' \, dz' \, dt'$$

in which $\int_{CS}$ indicates an integration throughout the cerebral substratum and $\int_{ST}$ denotes an integration throughout space-time.

In case of "telepathic contact," which may be displaced in space and time, we may expect that the "weight factor"

$$\Psi(x, y, z, t, x', y', z', t')$$

will be comparatively large if the points x, y, z, t and x', y', z', t' concerned belong to the two brain substrata in question.

For the rest it may be advanced that (2) is simply the old Indian wisdom incorporated in "Tat tvam asi" (identity of internal and external world), only translated in mathematical terms. For we may consider the right member of (2) as a mere summation in nonspatial and nontemporal sense (internal aspect); on the other hand, we can also consider this right member as space-time integral extended throughout space-time and again throughout the brain substratum concerned (external aspect).

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AN ESP EXPERIMENT WITH DUAL-ASPECT TARGETS INVOLVING ONE TRIAL A DAY

By G. L. MANGAN

ABSTRACT: The experiment reported here is a continuation of work carried out with a single subject. In the earlier testing with ESP cards, the subject scored significantly on forward displacement; that is, on the target coming just one later than the target which was intended. This same effect was predicted for the present series.

The subject was asked to make one trial a day for 100 days for targets which had two aspects, color and form (as, for example, a yellow rose). During the first half of the experiment the subject scored significantly on color, form, and complete hits for both direct targets and forward displacement. In the second half, the same high level of scoring was maintained only on the color aspect for the direct targets.

Considering the experiment as a whole, the results are highly significant, primarily because of the large number of complete hits (color and form both correct on the same day) on direct targets and on forward displacement. The author concludes that for the particular subject, a relatively few trials with low-probability targets seemed to be a better method of testing than to carry out a large number of trials with one-aspect targets having a higher probability.—Ed.

THE SUBJECT in the experiment reported in this paper had previously obtained significant results in an ESP test (8) using the conventional symbols: star, circle, square, cross, wavy lines. That work was a precognition series consisting of 2500 trials, divided into 100 runs of 25 trials each, with five runs completed in each daily session. The significant effect noted was that the subject scored significantly on targets coming one later than the assigned target. Since she had shown a similar (+1) displacement tendency in a preliminary series of tests of clairvoyance (i.e., ESP of contemporary events), such an effect appeared to represent a mode of response characteristic of this subject.

In carrying experimentation with her to a further stage, it was decided to make only one trial per day and to use a wider range of target material. The targets for most of this series were 25 pictures, each representing one of five flowers in one of five colors. In one part of the experiment figures were used instead of flowers. These flower-and-color targets are in the general class of multiple-aspect or, specifically, dual-aspect targets, since the subject must identify two aspects of the target (in this case the flower or figure and the

color) to secure a complete hit. Multiple-aspect targets such as playing cards and multiple-digit numbers have been used quite often in ESP experiments (e.g., **2, 5, 7, 11**). In several such studies, because of the low p-value of the target, a small number of trials provided sufficient data; whereas, when one-fifth probability material has been used, it has generally been considered necessary to plan for a larger number of trials.

A question which is relevant to the selection of target material is that of whether ESP operates at a fairly low but uniform level or whether at times, perhaps with certain subjects, it operates sporadically, very high-level performance alternating with indifferent or unsuccessful attempts. If the former applies, then the use of a large number of trials with one-fifth probability material would seem the more efficient technique. If the latter is the case, however, the use of such a method may result in a gross underevaluation of the subject's ESP ability. In order to capitalize on high-level performance when it occurs, comparatively few trials utilizing low-probability targets would appear preferable, and this was the main change introduced in the further work to be reported here.

Foster's (**6**) summary of some of the important experiments using multiple-aspect targets throws some light on the question of how the scoring in the cases she analyzed occurred. Although she was unable to interpret the findings unequivocally, her analysis indicated tentatively that subjects generally obtained an ESP impression of the target as a whole or that their hitting on the two aspects varied together. The evidence did *not* indicate that the subject was getting impressions of the separate aspects independently of each other and obtaining complete hits only when these happened to coincide. There is some conflicting evidence, however (**2, 7**). Hallett (**7**), in particular, found that at times subjects were able to respond more successfully to one aspect of the target than to the other. His subjects, both in the preliminary and in the main experiments, showed a decided preference for position over symbol, the two aspects presented by his targets. He suggested that, in the data Foster analyzed, the two aspects probably were more alike psychologically and were less artificially linked than in his experiment.

Procedure

The subject made her trials in San Diego, California, while the

experimenter was in the Parapsychology Laboratory of Duke University, Durham, N. C. At the outset, the statistical contract was set at 100 trials, to be done one trial per day, Monday through Friday. The 100 trials were divided into four sets of 25 trials. Each set, therefore, continued for five weeks, and the whole experiment for approximately five months. Scoring on the direct target and on (+1) displacement was predicted; all P-values, therefore, were given a twofold correction.

Before beginning each of the first three sets, the experimenter and the subject agreed on the choice of the five flowers and the five colors. These differed from set to set. In Set 4 the form aspect was changed from flowers to figures.

Every morning the experimenter determined the target for the day by the following method of randomization: Four three-digit numbers, obtained by four throws of three "bridge" dice (with 10 faces each) are multiplied together. This product is then multiplied by the digits in reverse order, and the square root of the product is worked out on the electric calculator. The last six digits of the resulting number are used to select a specific place in the Kendall and Smith table of random numbers. For example, if the digits are 612854, the 54 indicates the fifty-fourth block of 1000 digits in the table; the 28 indicates the twenty-eighth column; and the 61 indicates the sixty-first digit in that column. Starting with this entry point, the digits in the table are translated into target symbols. For example, in ESP card tests, 1 and 6 are equivalent to circle, 2 and 7 to cross, and so on. In this experiment, separate codes were established for the flower and color aspects, and independent calculations were performed in the determination of each aspect of the target.

This is a standard technique for assembling random target orders in the most carefully safeguarded ESP experiments. The complexity of the computations would appear to place the determination of the point of entry into the tables beyond the range of human control.

The experimenter assembled packs of 25 cards which covered all possible combinations of the two target aspects. In Sets 1, 3, and 4, the target for the day was separated from the pack and set aside until the following morning. In Set 2, the experimenter painted the target flower for each day, spending approximately one half-hour per day working with the target material.

The subject was encouraged to make her responses at any hour during the day and in any way she chose. She mailed a letter containing three of her daily responses to the experimenter every three days. This procedure had one disadvantage. When the subject sent her selections for the three days, there was no absolute guarantee that she had, in fact, made each one on the specified day. As far as contemporary psi is concerned, this makes no difference; but under the conditions, no conclusions could safely be drawn from forward displacement as regards evidence of precognition since one cannot be certain just when each attempt was made.

After the first two sets had been completed, it became apparent that the subject was showing a considerable deviation on forward displacement. At this point, an attempt was made to tighten up conditions so as to permit an unequivocal interpretation of this effect as a precognitive one. In Sets 3 and 4, therefore, the subject was provided with stamped, addressed, and numbered envelopes, and she was requested to send her selection for each day to the experimenter without delay.

In Sets 1 and 2, the experimenter, after determining the targets, handed duplicate copies to another staff member, Dr. Karlis Osis, who retained them until the end of each set. As the experiment proceeded, the targets were matched by the experimenter against the selections the subject gave. In Sets 3 and 4, however, when the subject sent her selections to the experimenter every day, the latter, on receipt of each letter, took it to the coexperimenter unopened. The letters were then opened by both observers and each selection was matched against the duplicate of the target for that particular day.

Although the original contract called for four sets of 25 trials, in fact the sets consisted of 23, 25, 23, and 24 trials, respectively: 95 trials in all. In the first, third, and fourth sets the subject failed to complete the specified number of trials through some mischance or miscalculation. The completed series was evaluated on the basis of the 95 trials completed, and no correction was considered necessary for these omissions. Even if the total number of trials is counted as 100 rather than 95, however, there is no change of any consequence in the probability values associated with the positive deviations on direct scoring and +1 displacement.

Results

Results for each set separately and for the four sets pooled for direct hits, forward displacement, and backward displacement are summarized in Table 1.

Table 1

Overall Results for Individual Sets and for the Four Sets Pooled for Direct Hits, Forward (+1) and Backward (−1) Displacement

Set	Direct Hits				Forward Displacement				Backward Displacement			
	Number of Trials	Color p=1/5	Form p=1/5	Complete p=1/25	Number of Trials	Color p=1/5	Form p=1/5	Complete p=1/25	Number of Trials	Color p=1/5	Form p=1/5	Complete p=1/25
1.....	23	9	9	7	22	9	9	6	22	6	5	1
2.....	25	8	9	6	24	7	9	5	24	4	4	1
3.....	23	10	3	0	22	3	5	0	22	3	6	0
4.....	24	8	2	0	23	8	5	2	23	5	5	1
Total...	95	35	23	13	91	27	28	13	91	18	20	3
M. C. E.	..	19	19	3.8	..	18.2	18.2	3.6	..	18.2	18.2	3.6
Dev....	..	+16	+4	+ 9.2	..	+8.8	+9.8	+ 9.4	..	− .2	+1.8	− 0.6

Direct Target Score

Chance expectation on the separate aspects of the target is 20%, on complete hitting, 4%.

In Set 1 there were 23 trials. On the color aspect there were 9 hits (39%); on the form aspect, 9 hits (39%). There were 7 complete hits (30%). In Set 2 there were 8 hits on color (32%); 9 hits on form (36%); and 6 complete hits (24%), from a total of 25 trials.

Sets 1 and 2 pooled thus comprised 48 trials. There were 17 hits on color (35%), 18 hits on form (38%), and 13 complete hits (27%). By the Poisson distribution applicable to low-probability material, the likelihood of obtaining 13 or more complete hits in 48 trials is $P < .00000001$. Where p equals one-fifth (when color and form are considered separately) the probability of obtaining 17 or more hits in 48 trials is .008; of obtaining 18 or more hits, .003.

The list of 48 target orders in Sets 1 and 2 with accompanying calls and the distribution of hits, is shown in Appendix 1.

In Sets 3 and 4 the form aspect declined. In 47 trials with ex-

pectation at a little over 9, the number of hits obtained was 5. Success on the color aspect, however, remained at the previous level. In Set 3 there were 10 hits; in Set 4, 8 hits. The pooled deviation on color in these two sets is significant at the .002 level. There was no complete direct-target hit in this part of the experiment.

For the four sets pooled, there were 35 hits on the color aspect. Expectation is 19, and the deviation of +16 is highly significant (P = .00004). On the form aspect, there was only a slight excess of hits over expectation. There were, in all, 13 complete hits where 3.8 are expected by chance. This deviation of 9.2 has an associated probability of .000002.

Displacement Score

As stated previously, the subject had displayed in earlier work a tendency to displace forward, and this effect was predicted for this series.

With the total number of displacement trials being 91 (since displacement from the end of one set to the beginning of the next was not considered), expectation on each of the separate aspects is 18.2; on complete hitting, 3.6.

In the four sets pooled, there were 27 forward displacement hits (30%) on the color aspect (16 of them in the first two sets) and 28 hits (31%) on the form aspect (18 in the first two sets). The deviations of +8.8 and +9.8 are significant at the .02 and .01 levels, respectively. However, only the first two sets contributed toward the significance of these results.

There were 13 complete hits (14%) on forward displacement (11 of them in the first two sets). With expectation at 3.6, the deviation of +9.4 is significant with a P-value of .0000006.

Backward displacement in all sets was approximately chance. Thus the subject's displacement scoring was consistent with her previous performance: on the target for one day ahead it was significantly positive; but on the target of the preceding day it was not significantly different from chance.

Discussion

The results of this experiment may be summarized as follows:

1. In this series of 95 trials with multiple-aspect targets in single daily trials, results of a very high order of significance were obtained,

particularly in the first two sets, on both direct and forward displacement. As the subject had previously displayed a forward displacing tendency, the present results confirm to a degree her characteristically individual mode of response in the ESP situation.

2. In the high-scoring first half of the experiment, did the subject usually respond simultaneously to both aspects of the target when she made a complete hit, or was the number of complete hits only about what would be expected from the success on the separate aspects? An evaluation of the degree to which hits on the aspects occurred together for direct targets gives probability values of .004 in Set 1 and .01 in Set 2 when calculated by the exact method; and .0001 for both sets pooled when the two-by-two table is tested by

Table 2

EXTENT TO WHICH THE TWO ASPECTS VARY TOGETHER IN SETS 1 AND 2, AND IN BOTH SETS POOLED (DIRECT TARGET RESULTS)

SET 1

	Form Hit	Form Miss	
Color Hit	7	2	9
Color Miss	2	12	14
	9	14	23

P (exact method) = .004

SET 2

	Form Hit	Form Miss	
Color Hit	6	2	8
Color Miss	3	14	17
	9	16	25

P (exact method) = .01

SETS 1 AND 2 POOLED

	Form Hit	Form Miss	
Color Hit	13	4	17
Color Miss	5	26	31
	18	30	48

χ^2 (with Yates' correction) = 14.58
P = .0001

chi-square (Table 2). The same chi-square test applied to the forward displacement results of both sets pooled also shows a significant tendency for hits to occur on both aspects simultaneously: $\chi^2 = 7.23$ (1 d.f.); $P = .007$. Either her responses were made to complete targets in a unitary fashion, or her hitting on the separate aspects varied together very closely (i.e., certain conditions strongly favored or disfavored both aspects simultaneously). It is apparent that the method of making relatively few trials with low-probability targets was more efficient for this subject under the conditions of this experiment.

3. Inspection of the hit distribution for both direct-target scoring and forward displacement in the first half of the experimental series reveals quite clearly that the subject's success was not uniform throughout these two high-scoring sets. (See Appendix 1.) There are no direct hits on either aspect in the first 10 trials of the 48 under consideration, and few in the last 8 trials. In these 18 trials, however, the subject was highly successful in forward displacement. Most of the direct scoring and all the complete hits on the direct target occurred in the middle 30 trials. In forward displacement, on the other hand, the high rate of success began with the complete hit on the seventh target (sixth response) and it held up at a consistent level, even though lower than the peak rate on the direct target, until the end of Set 2.

4. In the second half of the experiment the results were quite different. In her direct hitting, the subject continued to score high on color but fell below the chance level on form. The forward displacement was at the chance level for both aspects. Whether this change in results was in fact due to a normal decline effect or whether it was the result of the changed conditions is a matter for conjecture. For whatever reason, a change in the dynamics of psi functioning obviously occurred.

This is an effect quite commonly noted in ESP experiments. Foster (**6**) pointed out that subjects might have different attitudes towards the separate aspects, and that this might result in negative scoring on one aspect, positive scoring on the other. If one of the aspects is novel, or has novel features, one would anticipate, following the findings of Pratt and Woodruff (**9**), Thouless (**13**), and

Cadoret (3) that high scoring would tend to be associated with the novel task, the reverse of what happened here.

Further evidence bearing on concurrent positive and negative scoring is obtained from those researches in which contrasting conditions in the same experiment, rather than contrasting aspects of target material, were compared. Bevan (1), Stuart, Humphrey, Smith and McMahan (12) and Thouless (13) all found that in such cases the scores on the favored task tended to be positive, while those on the nonpreferred task tended to fall below the chance level; that is, the response of the subject is likely to indicate an active rejection of the less-preferred task. As Rhine (10) points out, there seems to be something more involved than a mere drainage of interest in this type of experiment. The data of the present experiment are too limited to permit anything but a tentative judgment on this point, but it may be noted that the less favored aspect (form) gave a distinctly negative deviation in the direct-target scoring of the third and fourth sets.

Appendix

Small capitals are used in the call column to show direct hits; in the target column, to show forward displacements.

Set 1

Call	*Target*
1. red rose	yellow chrysanthemum
2. white gladiolus	yellow ROSE
3. orange gladiolus	purple bougainvillia
4. purple bougainvillia	red begonia
5. red bougainvillia	yellow begonia
6. yellow rose	white chrysanthemum
7. purple bougainvillia	YELLOW ROSE
8. orange gladiolus	white begonia
9. red begonia	ORANGE GLADIOLUS
10. yellow chrysanthemum	RED BEGONIA
11. PURPLE BEGONIA	purple begonia
12. red chrysanthemum	PURPLE gladiolus
13. RED CHRYSANTHEMUM	RED CHRYSANTHEMUM
14. WHITE begonia	white bougainvillia
15. YELLOW CHRYSANTHEMUM	yellow chrysanthemum
16. YELLOW rose	YELLOW begonia
17. PURPLE CHRYSANTHEMUM	purple chrysanthemum
18. red ROSE	white rose
19. WHITE CHRYSANTHEMUM	white chrysanthemum
20. WHITE ROSE	WHITE rose

Appendix (contd.)

21.	yellow ROSE	orange ROSE
22.	YELLOW ROSE	YELLOW ROSE
23.	white gladiolus	purple ROSE
24.		WHITE GLADIOLUS

Set 2

	Call	*Target*
1.	red rose	white chrysanthemum
2.	WHITE GLADIOLUS	white gladiolus
3.	yellow begonia	purple GLADIOLUS
4.	PURPLE bougainvillia	purple chrysanthemum
5.	RED BEGONIA	red begonia
6.	purple ROSE	white rose
7.	PURPLE BEGONIA	PURPLE begonia
8.	orange gladiolus	red rose
9.	yellow chrysanthemum	ORANGE rose
10.	yellow chrysanthemum	white bougainvillia
11.	red bougainvillia	YELLOW CHRYSANTHEMUM
12.	ORANGE gladiolus	orange BOUGAINVILLIA
13.	purple rose	red GLADIOLUS
14.	RED CHRYSANTHEMUM	red chrysanthemum
15.	purple begonia	RED CHRYSANTHEMUM
16.	RED CHRYSANTHEMUM	red chrysanthemum
17.	YELLOW ROSE	yellow rose
18.	white rose	orange bougainvillia
19.	red ROSE	purple ROSE
20.	white begonia	RED ROSE
21.	purple chrysanthemum	yellow gladiolus
22.	red begonia	PURPLE CHRYSANTHEMUM
23.	white chrysanthemum	purple bougainvillia
24.	orange CHRYSANTHEMUM	WHITE CHRYSANTHEMUM
25.	purple gladiolus	yellow rose

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REPORT ON TWO EXPLORATORY PK SERIES

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ABSTRACT: The experiment reported here involved two kinds of PK tests. In one, the subjects were asked to toss 100 coins at a time for either the number side or the face side as target. Altogether, they made 1530 tosses (153,000 coin-throws). The other type of test was based on the use of a roulette wheel. In this part of the experiment, the subjects made 26,200 trials in which the target was either "Black" or "Red." On neither type of test were the overall scores statistically significant; but the results do contain convincing evidence of an extrachance effect in the work of one outstanding subject, a 17-year-old high-school student. His scores on both kinds of tests were significant. The author considers that PK is the only interpretation that can account for the results of this subject. The method of evaluation used by the author was based on the assumption that the tests were unbiased; but the results were significant even when re-evaluated by a statistical method which avoided this assumption.

The work represents the first parapsychological research by this investigator, and the project was in the true sense an individual, pioneering undertaking. The value of the paper can therefore be appreciated only if the work is considered in its proper category, as an exploratory effort to develop tests for PK in situations that have not heretofore been systematically studied. The report is being published in the JOURNAL at this time primarily to make the information about the research available to other investigators, though the procedure and results will also be of interest to the general reader.

Dr. Binski's report is based on an experimental thesis for which he received his doctorate from the University of Bonn.—Ed.

Introduction

The work reported here was carried out from 1950-51 at the Psychologische Institut of Bonn University under Prof. Dr. Siegfried Behn, at that time the director of the institute. The purpose was to test for psychokinesis (PK) to see if the results of the experiments of Rhine and others could be verified in Germany.

In principle, the procedure was like that used in other investigations in that it involved trying to influence moving objects by PK. Whereas other investigations have chiefly been done with falling cubes, the present investigations were done with coins tossed for a specified target face or with spheres tumbling in a regulation roulette wheel.

The report can only now be published, because the author was

for several years prevented by certain events of a political nature from finishing the work.[1]

The two kinds of tests, those with coins and those with a roulette wheel, were conducted more or less simultaneously as parallel series. However, for convenience each series will be reported in a separate section of the paper, and then a general discussion of the results will follow.

The Series With Coins

Procedure

The coin tests involved throwing 100 coins (German 10-pfennig pieces) at a time, for either the number side or the picture side as target. The use of this large number of coins per throw served two purposes: (1) It more quickly provided the amount of data needed for statistical evaluation; (2) it seemed to exclude the possibility that the subject might consciously or unconsciously employ skill in throwing the desired face.

The subjects were volunteers who were accepted without regard to age, sex, or other factors. Of the 117 subjects who took part in the tests with coins, most were college students and high-school scholars. The subjects were introduced to the task in a free and informal way.

The experiments were carried out at a large table which stood in a corner, with two sides touching the walls. The subject stood close to the table and, after his "wish" had been recorded, threw the 100 coins at a time from his cupped hands to a height of about a meter above the table. Then he stepped back while the experimenter and an assistant pushed together the coins cautiously, with their sleeves tucked up to avoid any unnoticed movement of the coins by the sleeve. The two sides of the coins were called "Number" and "Picture." "Numbers" were placed on one side of the table and "Pictures" on the other, arranged in groups of ten (two rows of five). Then the experimenter and the assistant changed their sides to check whether a picture had been overlooked on the number side, or vice versa. The coins on both sides of the table were counted and the result was recorded by the experimenter. Then the coins were swept together and thoroughly mixed in a pile by the experimenter. After this, the subject approached for the next throw and the coins

[1] See the *Parapsychology Bulletin*, No. 41, April, 1956.

were swept off the table into his open hands, which were held at least 30 cm. below the table. Thus at three distinct points—the mixing on the table, the dropping into the subject's hands, and the tossing into the air—the procedure provided for randomizing the coins and eliminating the possibility that skilled throwing could have been a factor in the experiment.

General Results

One set consisted of 10 throws of 100 coins each, i.e., of 1000 trials or coin-throws. The whole series contained 153 sets; i.e., 153,000 coins were thrown in 1530 throws. In addition, 6000 coins were thrown as a control without specifying a target and as far as possible without a conscious preference for either side. The distribution of faces in the control throws was 3039 Numbers to 2961 Pictures ($P = .3$). This supports the general assumption that German 10-pfennig pieces are a reliable "apparatus" for registering random events under the conditions used in the experiment.[2]

The 153,000 coins tossed in the PK tests fell with the target side up 76,866 times, and the nontarget side 76,134 times. Where two alternatives, each with a probability of ½, are involved, the difference between two observed totals may conveniently be evaluated by chi square.[3] Thus for the overall results of the coin tests:

$$\chi^2 = \frac{(76{,}866 - 76{,}134)^2}{76{,}866 + 76{,}134} = \frac{535{,}824}{153{,}000} = 3.5 \ (P = .06)$$

The total score for the target face is not statistically significant.

[2] Even though the control series as well as the experimental data from all the subjects except one (K.S.) gave distributions of faces which closely approximated the 50-50 division expected with unbiased coins, it is still necessary to question the assumption that the coins were unbiased. The usual procedure in a PK experiment is to throw equally often for each of the possible targets. When this is done, a physically biased situation would decrease the variance while leaving the expectation unchanged, and the error introduced into the statistical evaluation would be on the conservative or safe side. In the present exploratory investigation, the experimenter preferred for psychological reasons to leave the choice of the target to the subjects, which led to an inequality in the use of the two sides of the coin (as well as of the two colors in roulette) as target. Consequently, it is not possible to evaluate the results set-by-set in a manner that takes into account the possible effect of bias. For this reason, the statistical evaluations of the individual sets of K.S. as given in the body of the report may be taken only as approximations.

The main question, however, is whether the results of K.S. are statistically significant as a whole when evaluated in a way that does not involve the assumption of unbiased coins. We are indebted to our statistical editors for suggesting a method which meets this requirement. This is explained and the results of the analysis are presented at the appropriate point later in the paper.—Ed.

[3] All chi squares presented in this report have one degree of freedom unless otherwise designated.

The results as a whole may also be examined in other ways. One of the most obvious analyses is to evaluate the distribution of the scores on the 1530 throws of 100 coins. There were 711 throws which gave 51 or more target faces; 693 with 51 or more of the non-target faces, and 126 with an equal, 50-50 division. The chi-square test, as shown above, may be applied to the 1404 throws which gave an unequal division of the faces:

$$\chi^2 = \frac{(711-693)^2}{1404} = .23,$$

an obviously chance result. Likewise, the comparison of the number of positively and negatively scoring sets (10 successive throws by a subject for the same target face) is insignificant, there being 80 scores above 500; 71 below; and two of exactly the mean chance expectation.

Coin Results of a Single Subject

Considered as a whole, therefore, the mass of data with coin throwing do not show any impressive departures from the theoretical random distribution. Yet there was one subject whose performance in six sets was so remarkably different from the others and from what would be expected on the chance hypothesis that his results justify and even require consideration apart from the others. He was Kastor Seibel, a 17-year-old scholar at a high school in Bonn.

K.S. began as a subject on Feb. 2, 1951, in the roulette series. He wished "Red" and had 58 hits in 100 trials. On March 1, 1951, he took part in a second experiment with the roulette wheel and had 56 hits. After this he was interested in the experiments and was prepared to take part in the coin experiments also.

The first experiment with coins (Set No. 123 in the total series of 153) was carried out on March 5. K.S. wished "Number" and scored 548 numbers to 452 pictures. Such a result had never been reached in the 122 antecedent sets. Also it was not reached or exceeded later, except by K.S. himself. This first coin set of K.S. had a P-value of .003, and the further work with him was undertaken as an effort to confirm his outstanding performance to this point.

For his next experiment, K.S. appeared the following day. He

again wished "Number" and surpassed his success in the first set with a score of 561 on the wished side ($\chi^2 = 14.88$; P ~ .0001).

His third set was made on March 8. The safeguards against errors were made especially severe; a second experimenter observed the first one, and after every throw K.S. was immediately led out of the room with his hands held behind his back. Even without these measures there was no possibility of fraud (unless one imputes connivance to deceive to a number of people, including the experimenters), but we introduced them to forestall possible suspicions. This time K.S. was especially nervous. At every throw he thought the result would be negative. His eagerness to get a positive score on the set was extremely great. He wished again for "Number" and scored 582 hits ($\chi^2 = 26.90$; P ~ .0000001). Thus he bettered his own record under severe controls.

The fourth set followed on March 9. Before the experiment, K.S. said: "I will have a bad day today." He wished for "Number" and got 549 hits ($\chi^2 = 9.60$; P < .002).

In his next coin experiment, his fifth (March 15), K.S. was asked to wish for "Pictures." Up to this point he had always wished for "Number," which emotionally appealed to him. His score was 574 hits ($\chi^2 = 21.90$; P = .000003).

K.S.'s sixth and last coin test was carried out on March 22. He wished "Number" and reached 526 hits—his lowest result ($\chi^2 = 2.70$; P = .1) and the only one that did not far surpass the usual criterion of statistical significance.

In a strict sense, only the last five sets of K.S. should be considered as relevant to the question of whether he showed special ability to influence the fall of the coins in the direction of his "wish." That is, the first set (together with the positive scoring done on the roulette wheel up to that time) only provided the basis for the hypothesis that he was a special subject. The day-by-day results on these five sets are enough to show clearly that he did have the special ability in question, but it is interesting nevertheless to summarize the five sets as a whole. These five sets yielded 2792 target hits and 2208 misses ($\chi^2 = 68.21$; P < 10^{-10}). Since these results are so highly significant and are even more remarkable in rate of success than the first, unanticipated set score, there is no reason to consider that first result as merely fortuitous, and those data may be con-

sidered along with the rest in comparing K.S.'s coin results with the results of the other subjects.

Of the 60 throws made by K.S., 46 were positive, and 11 were negative (the remaining three being neutral, or 50-50). The other subjects combined had 665 throws with positive scores and 682 with negative scores (leaving 123 throws that were 50-50), an obviously chance distribution. A chi-square test of the difference between these two ratios gives $\chi^2 = 21.48$ ($P = .000004$). Thus the data fully support the hypothesis that K.S. had a special ability which was not demonstrated by the other subjects.[4]

After the first experiments with K.S., a lady appeared and introduced herself to the experimenter as the young man's mother, Dr. Kaethe Seibel, widow of a high-school director and herself a high-school teacher. She then proceeded to speak as follows:

"My son told me about the experiments you are doing with him. I am alarmed about this and do not like to allow further experiments with my son.

"For generations there has been in my family a hereditary capacity called 'second sight.' This capacity to foresee accidents and deaths was a heavy psychical burden for some members of my family. When the last male scion of the family, a Catholic priest, died on the foreseen day, my husband and I made an agreement that our children never should know anything about that unhappy capacity. Up to now I was able to conceal all this from my sons, and, thank God, until now in none of them has there been any indication of a 'dark' gift. I hope you will understand how much I am alarmed about this unexpected outbreak of the buried mystery!"

A sober discussion on the capacities in question in the light of

[4] The following method of analysis which does not depend upon the assumption of unbiased coins was suggested by our statistical editors. It may properly be applied to the last five coin sets with K.S., which were undertaken as an effort to confirm K.S.'s promising results and may therefore be considered separately. The analysis involves a comparison of the ratio, Number/Picture, when Number was target, with the same ratio when Picture was target. On the null hypothesis, these two ratios should approach equality regardless of the bias of the coins. On the PK hypothesis, the first ratio should become *larger* when Number is target, and the second *smaller* when Picture is target. This analysis applied to the five crucial coin sets of K.S. gives the following results: Number/Picture when Number was target: 2218/1782 (55.5% Number); Number/Picture when Picture was target: 426/574 (42.6% Number). Testing the difference between these two ratios in a fourfold table by means of the usual chi-square test gives $\chi^2 = 53$, with $P < 10^{-11}$. Thus it is clear that the results of K.S. are highly significant when they are considered in a way that does not involve the assumption that the coins were unbiased. —Ed.

parapsychology had the effect that Dr. Seibel herself was prepared to act as subject in the experiment and to send also her elder son to our laboratory. She agreed to the further experiments with her son Kastor.

The experiments of the mother and the elder brother of K.S. had no significant results.

K.S. is now (in 1957) 23 years old and a student of philology and literature at the University of Bonn. Some new experiments with him had encouraging but not statistically significant results.

The Roulette Series

Procedure

In using any kind of mechanical apparatus to test for PK, the question of the reliability of the instrument for this purpose must always be taken into account; and it is more difficult to establish the dependability of such an apparatus than it is to use a simple situation such as the thowing of dice or coins. Before the decision to use the roulette wheel was reached, tests were made with two other kinds of specially constructed instruments. Both proved to be useless as PK testing apparatus. One of them had been brought by long development to a point of high precision; but still small changes in temperature, air currents, incautious touchings, etc. changed the operation of the instrument. I came to the conclusion that apparatus the exactness of which may be affected by outside influence must be regarded as in principle unsuitable for investigating PK.

The roulette wheel, however, meets the basic requirements for a PK test. It consists of a plate-like, round shell of lacquered hard wood in which there is a metal disk, mounted on a precision, steel, needle-point bearing, which may be rotated. In the disk there are compartments of equal size numbered from 0 to 36 in irregular order. With the exception of the zero compartment, the others are colored alternately red and black. When the rotating disk is set in motion a small sphere (such as a marble), or several spheres will be spun around in the shell by the rotating disk. As the rotation slows down sufficiently, the marble falls from the wall of the shell into one of the compartments.

In the case of roulette one cannot imagine any outside physical influence (except a violent deterioration of the apparatus) which

would consistently favor one of any two designated possibilities (such as "Red" and "Black"). Given a roulette wheel in good condition, whatever may be the position of the apparatus or however it may be changing during the rotation, neither Red nor Black will be favored by this. Even if the shell is not completely level, or the marbles are not true spheres, or there are air currents in the laboratory, or the disk is braked, nothing of this sort will have, on the average, any effect in favor of one of the two possibilities. The fundamental condition, that the probability for the two alternatives must remain equal at one-half, will not be affected. Whether any particular wheel is so well constructed that the mathematical probabilities work out in practice is a matter for experiment: one must test it.

For the purpose of testing the roulette wheel used in this experiment, 2000 control throws were made. The result was 990 Red to 1010 Black, which supports the reliability of the apparatus. But we have still further comparisons that can be made to test the apparatus. The 36 numbered compartments (the "zero" was not counted and throws on it were repeated) may be divided not only into 18 red ones and 18 black ones, but also into the groups "Even" *vs.* "Odd" and "1–18" *vs.* "19–36." On these groupings the 2000 control trials had 1018 to 982, and 971 to 1029, respectively. More evenly divided distributions would scarcely be expected. The roulette wheel intended for the PK tests apparently met the necessary requirements.

There were 123 subjects, most of whom were the same as those used in the experiments with coins. They were introduced to the task in a way similar to that used in the coin series. Here, too, an effort was made to create a good "atmosphere" and to minimize possible inhibitions of the subjects. All experiments were made with the same apparatus. A set in the roulette tests was taken as the observation of 100 marbles.

Results

In addition to the 2000 control throws without a target, 26,200 marbles were thrown with the wish to influence them to land upon "Red" or "Black" as the designated target. These 26,200 trials may be regarded as falling into either of two different groups. The 262 sets were divided into single sets and series of sets. In single

sets, each subject had one or several sessions amounting to a total of 172 sets, in each of which the subject chose his target color. In the series of sets, five subjects each had a number of sessions without changing the target. Altogether these contributed 90 sets. The two groups, single sets and series of sets, will be considered together as well as separately.

In the whole series of 26,200 trials, the target color was obtained 13,276 times, and not obtained 12,924 times ($\chi^2 = 4.73$; $P = .03$).

In the 17,200 trials of the single sets there were 8750 hits and 8450 misses ($\chi^2 = 5.23$; $P = .022$). Of the 9000 trials of the series of sets there were 4526 hits and 4474 misses, a chance distribution. Of the total 262 sets, 138 were "positive," 97 "negative," and 27 neutral. The distribution of 138 positive and 97 negative gives $\chi^2 = 7.15$ ($P = .008$). The distribution for the single sets was 95 positive, 61 negative, and 16 neutral, with the difference between the positive and negative groups having a χ^2 of 7.41 ($P = .007$). Again, the data for the series of sets yielded only a chance distribution.

The data were all analyzed, as "controls," for odd-even and low-high numbers as well. These gave differences that were well within the range of normal sampling variation; but one subject, the experimenter himself, showed a striking tendency to score low numbers (1–18). It is interesting to observe that this happened (a result with $P = .0004$) in the data of the only subject who knew that the findings would be analyzed in three ways, instead of for Red-Black only, as the other subjects were led to expect. This unusual difference suggests (but only suggests) that unconscious motivation may enter into the selection of a "target" and the use of PK may occur without the conscious knowledge and intention of the subject.

In view of the outstanding success of K.S. with the coins, it is interesting to single out his performance on the roulette. He did a total of five sets of 100 trials each at roulette with the following scores: 58, 56, 55, 48, and 64. Thus he had 281 hits and 219 misses in 500 trials, a significant excess on the target ($\chi^2 = 7.69$; $P = .006$). The average rate of success for him on roulette was comparable to that on the coins, though there is no similarity in the levels of statistical significance because of the great difference in the number of trials under the two conditions. It is not reasonable,

therefore, to suppose that his success was limited to the one type of test on which data could be taken so much more rapidly and which was used more extensively as a matter of convenience.

Analyses were made of both the coin and roulette data for position effects within the set and for chronological effects within each series. These did not, however, reveal any tendencies that approached the usual level of significance; nor were they even of suggestive value, and they therefore need not be reported in detail.

Discussion

The results of K.S. were highly significant statistically. The first point for discussion, therefore, is the question of the interpretation of his results. With what degree of assurance may one say that they indicate the successful influencing by PK of the falling coins as well as the tumbling spheres in the roulette wheel?

The fact that the coins were thrown by hand makes it necessary to consider whether muscular skill might have been used. Could the subject have been able to throw the coins in such a way that they tended to fall with the same faces (or the opposite faces) uppermost as were on top as they lay in his hands before the throw? Even if such a skill could be acquired, it would be of no use unless the subject knew how the coins lay before the throw; and this information would have to be acquired either on a sensory basis or by ESP. Just before each throw the coins were made to fall into the cupped hands of K.S. by the experimenter in the same way as they were placed in the hands of the other subjects. If K.S. had needed to see the coins and to shake them until he had a preponderance of the desired faces on top, the observers would have noticed the difference between his way of handling them and that of the other subjects. As a matter of fact, K.S. showed no interest in looking at the coins before making his toss, and his manner of throwing was not different from that of the others.

Another question is that of whether the method of tossing coins gave an adequate randomization of the faces from one throw to the next. For example, if the number side predominated on any particular throw of the set, was it any more likely to turn up with a greater-than-expected frequency on the succeeding throw? This question could conceivably be answered in the affirmative if the coins had simply been swept off the table and placed in the subject's hands

without being adequately randomized. But the specific steps taken in the procedure to insure adequate mixing have already been described.

The large preponderance of attempts made by all the other subjects which gave chance results may be cited as an additional control on the coins. All the evidence points towards coin throwing as used in the experiments as being an adequate randomizing procedure for the purpose of the test.

A special question which arises within the area of parapsychology itself is whether K.S., in choosing his own target, might have succeeded through precognition rather than PK. May the coin results themselves be merely a random series, and was K.S. simply choosing the target which would take advantage of the chance variations to obtain a positive score in the direction of his aim? This question may be answered in the negative for two reasons. First, the actual numbers of successes on the separate throws showed such large departures from the 50-50 distribution expected by chance that they cannot reasonably be attributed to merely random variations. Something was happening to give nonchance differences between the two faces when K.S. threw the coins. But a second and even more compelling reason why precognition cannot explain the results is the fact that the target was not selected for each throw but rather for a whole set. The likelihood that such results as those of K.S. could be duplicated by selecting the target to fit the variations within a chance series is so small that this interpretation can be safely excluded. A further point, of course, is the fact that in one set the subject was not allowed to make his own choice of target, but was requested to throw the coins for his nonpreferred face.

All things considered, therefore, it seems that the PK hypothesis is the only reasonable interpretation for his coin-tossing results. It is further evidence in support of this conclusion that K.S. also got significant results with the roulette wheel even though his number of trials with that procedure was much smaller than in his work with coins.

The fact that the only results that were significant beyond question were due to the efforts of a single subject is a reminder that one must not expect too much from experiments with unselected subjects. One cannot doubt that parapsychical capacities are present

to a very different degree in different persons and even in the same person at different times. One consequence of this situation is that mass experiments with statistical evaluation of the results may not be the optimum way to clear up questions regarding the nature of parapsychical phenomena. Each type of investigation, the "en masse" experiment and the individual experiment with the person of proved psi capacity, has its proper and important place in parapsychological research. The suggestion of a hereditary basis of PK ability in K.S. should encourage further efforts to link this ability with both personal and family experiences.

The differences in parapsychical ability from person to person and even within the same person have another important consequence for parapsychological experiments: we cannot expect "exactness" in psi results in the same sense as one expects it in physics. Complete exactness presupposes the constancy of all the factors involved, and this constancy can be obtained only in the inorganic sphere. In the biological and still more in the psychical spheres, nothing exists which can with certainty be repeated without variation in quality and in quantity. Consequently, an experiment in either of these fields cannot in principle be literally repeatable. This is a great disadvantage in comparison with experiments in which one must deal only with purely physical factors. But the difficulty is inherent in the subject matter itself and it cannot be avoided by any methodological consideration; not only is every parapsychical factor variable, but the possibilities for influencing it are also very limited. If this were not so, the question of the occurrence of psi effects would long ago have been answered to everyone's satisfaction. But the task of the investigator is not to study psi capacities as he would like them to be but as they are, and by degrees to advance toward a better understanding of their role in personality as a whole.

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BOOK REVIEWS

PARAPSYCHOLOGY: FRONTIER SCIENCE OF THE MIND. By J. B. Rhine and J. G. Pratt. Springfield, Ill.: Charles C Thomas, 1957. 222 pp.

This is a textbook in parapsychology. It is the first time in this field, to the knowledge of the present reviewer, that action has been taken (by a publishing house specializing in science textbooks) to serve the need for a parapsychological "primer." At a time when very little formal instruction is available in parapsychology, this book should be of real use to the intelligent newcomer. It will provide material if his interests take a theoretical bend; and if he sees himself as a future experimenter, he may find it as valuable as a pack of cards or a handful of dice. The emphasis is on experimental procedure, and half the book is taken up by a thorough discussion of testing conditions, the assessment of results, and how to create the most advantageous psychological conditions for laboratory work. The remainder is devoted to an examination of the findings of parapsychology and its relation to other branches of science. All chapters are followed by extensive bibliographies which will enable the reader, whose first curiosity is tempered into a more perservering interest, to follow the trail to where the facts are most fully presented. If he is stimulated to carry out tests of his own, he will be aided by a battery of tables which at a glance will give the significance of his results. There are also a glossary, several illustrations in photogravure, and an index.

The book is divided into two parts. The first, except for Chapter 2, is devoted to an outline of the research findings. Chapter 2, perhaps the most significant in the book, charts the main research methods, and Part II illustrates them by detailed plans for experiment and assessment. I shall discuss Chapter 2 and Part II first. The authors here share their experiences about the best routes and equipment for reaching research objectives in this field. Parapsychology is rather like mountaineering (and several parapsychologists are in fact avid mountain climbers). Not only are the rewards slight in terms of ordinary values, but the means for achieving the aims are similar. The journey in both cases has two stages, ex-

ploration and confirmation, and the equipment taken along must be dependable without being cumbersome. In the exploratory stages, where liberty of movement is essential, the gear must be light and pliable. The purpose is not to prove but to probe, to find new phenomena or new approaches to the old. It is only when this preliminary purpose has been served that the concern is shifted to verification of the findings and, with it, to more reliable ways of investigation.

Five exploratory methods are listed. The "case-study method" forms the historical beginning of parapsychology and still has a significant function for discovering new paths for experimental attack. Another exploratory procedure is the "individual screening method," used to select gifted participants for larger experimental projects. In the "pilot-study method" the investigator tries out his expectations in a small compass before committing himself to the crucial experiment. This method "is especially needed to offset the tendency of over-enthusiastic experimenters to plunge into elaborately designed projects right from the start . . . to demonstrate their . . . unsupported expectations."

A fourth method is "the re-examination method" in which old data are examined for other purposes than those the original experimenter had in mind. The findings unearthed by this method may then be verified by new experiments or by finding similar effects in other batches of old data.

Finally there are "methods for clinical and other practical uses." These are mainly ways of adapting psi tests to nonexperimental situations, and the tests are not exploratory in the sense that they will necessarily be followed by confirmatory research if successful. The aim is practical application rather than scientific investigation and the procedures used will be dictated by the specific purpose for which the research is undertaken and by the conditions surrounding it. For instance, a psychiatrist who wants to find out whether one of his patients has ESP is likely to use standards similar to those he employs in other diagnostic work.

These pages are probably the first in which the need for exploratory work in parapsychology has been explicitly stated. This delay may be attributed to the fact that not so many decades back the demand was for the kind of experimentation which could con-

clusively prove the very existence of psi. The higher the pile of precautionary measures was, the better the experiment served its purpose. Now there is a need to tone down the requirements to a long-range view and to free oneself from the harassed compulsion to apply all laboratory resources for the grand experimental attacks. These of course have a place but only after preliminary try-outs have tested the ground. The time to try the ascent is after successful reconnaisance. To jump to the second stage at once may mean a plunge which can be dear in research time and laboratory resources as well as in personnel; for it is difficult to retain interest when one's major efforts fail.

But never to reach the stage of confirmation is equally fatal. It is depressing in the first part of this book to see how many research projects of the greatest promise were in fact never followed up. There are even experimenters of long standing who have never left the exploratory stage. The book will render a great service if it reminds them of the need for securing their position after the first successful explorations.

Of course there will be instances when parapsychologists are going to differ as to what is exploratory and what should be included with the confirmatory researches. For example, this reviewer would place the PK studies in which quarter-distribution declines were found by the re-evaluation method in the exploratory, rather than in the confirmatory group; for the experimental conditions in these (early) PK experiments were still fairly undeveloped. It would seem that the effects, though not aimed for at the time of the tests, nevertheless needed to be verified by research with confirmatory procedures—as the authors indicate they now have been.

When they turn to "Methods of Verification," the authors first discuss the statistical evaluation of results and then consider the experimental conditions. They point out that good conditions are more easily obtained in clairvoyance than in telepathy or GESP tests and still more easily obtained in precognition experiments (but it may be more difficult to convince the subject that he can score as well here as in the two other types of tests and the results may suffer for this reason). In PK the problem is how to ensure that the effects are not due to physical imperfections in the apparatus, and methods are outlined for counteracting manual and mechanical inter-

ferences. A major requirement of crucial psi research is that the possibility of recording errors be excluded. To guard against these it is proposed that two experimenters team up in confirmatory projects (except in PK tests where photographic recording of the results is advised because the presence of another observer may disturb the subject). In both exploratory and confirmatory work it is also essential that the plan of research, including the number of trials and the methods of assessment, be decided beforehand and followed faithfully throughout the tests. Otherwise there is no way of telling whether the scores are due to a favorable point of stopping, to interim statistical manipulations of the data, or similar irregularities.

After this discussion of procedures designed to ensure that the effects observed are *psi* effects, the authors turn to methods for distinguishing between various *forms of psi*, such as ways to obtain results in telepathy tests which are not due to clairvoyance and vice versa, and results in precognition tests which are not due to psychokinesis and vice versa.

Specific test procedures of the exploratory and confirmatory types are outlined in Part II in the chapter "Some Basic Psi Test Procedures," whereas the chapter "Statistical Methods" demonstrates the principal ways of assessment with the aid of several easy examples. The authors consider the suggestions in "Psychological Recommendations for Psi Testing" are as essential for the successful outcome of experimentation as those concerned with scientific procedure. It is emphasized that psi is a psychological function and should be allowed "every possible psychological consideration." Perhaps the most important factor in the task of stimulating latent psi abilities is the personality of the experimenter and the extent to which he is able to build up the right relation with his subjects. The interpersonal rapport so essential for psi success may be found outside the laboratory but rarely in situations which allow the introduction of proper experimental techniques. However, the teacher-pupil relation, as explored in the recent ESP school research, is an example of such a fertile combination whose effects can be gathered by the familiar laboratory procedures.

According to the foreword, the book is not directed to the veteran parapsychologist, who is presumed to know the literature

of his field at first hand. It only sets out to give a description of the results and the way they are obtained. But this is only true for the sections of the book yet to be reviewed. The findings presented there are likely to be known to those familiar with the experimental literature, and the reasoning which links them together or traces their implications may be found in earlier publications by the authors. However, this close familarity with the facts and the failures and successes in finding them has stimulated new and original thinking. The research rules formulated in this book will not be found anywhere else. These chapters are as much prescriptive as descriptive. They propose how the course of research should be charted and do not merely record it. This is where the book will command attention also from those already long in the field. Perhaps some will object that it is too early to systematize parapsychology, but the present reviewer feels strongly that the time is ripe for agreeing to criteria for the conduct of empirical work. The place for (responsible) independence and freedom from strictures is in the ideas and hypotheses submitted to research; but the actual conduct of this research should conform to accepted standards.

The first part of the book, except for Chapter 2, is devoted to a survey of parapsychology and its relation to other areas of knowledge. In "A Field of Science," the authors briefly describe psi phenomena. They are events of nature whose main characteristic is that their explanation lies outside the scope of physical laws. Psi effects are subdivided into extrasensory perception and psychokinesis, the characteristics of which are discussed first. They then differentiate the three forms of ESP; namely, telepathy, clairvoyance, and precognition. It is wisely pointed out, however, that the distinction between ESP and PK does not necessarily coincide with any difference in the nature of the process. All we have is a difference in effect. Similarly, the terms "telepathy," "clairvoyance," and "precognition" only distinguish experimental procedures and do not necessarily imply any deeper differences.

In the chapter "The Facts About Psi and Its Types" the empirical foundation for parapsychology as a whole is evaluated first, and then the facts supporting each of the different types of psi. The authors find that the collections of spontaneous cases now give supporting proof of the reality of psi though the weight of the evidence

rests on a bedrock of rigidly conducted experiments. They bring in displacement effects and decline curves as further evidence because these indicate the lawfulness of the process, and they discuss the work which has repeatedly demonstrated a relation between ESP and attitude to show another area of regularity and lawfulness. The authors then look into the evidence for each of the four manifestations of psi. They conclude that there are clairvoyance results which cannot be explained by telepathy, and that telepathy has also been illustrated under conditions which preclude clairvoyance. (But it is not possible to know for certain if the percipient in a telepathy test is not cognizing the physiological or neuro-physiological accompaniments of the agent's thoughts.) With regard to precognition, the authors find the evidence highly indicative but point to the need for collection of further data.

They consider that the most convincing aspect of the PK material until now is the decline effect. This was discovered when the re-examination method was applied to the records of exploratory PK tests. The possibility that apparent PK effects may be due to the subject's precognition of the fall of the dice is countered by the significant results in research in which the order of the target faces had been determined before the tests. The decline as shown in the quarter-distribution analysis also argues against precognition. (The proposal made earlier in the same chapter, that the existence of PK and precognition can be logically inferred from the nature of ESP, is the only instance when the authors summarized their arguments to a point where this reviewer did not wholly follow them.)

In "Psi and the Physical World" the relationship of psi to various physical conditions is considered. The authors refer to the researches which indicate that ESP is not related to distance. But they leave the question "as to whether there is *any* relationship, direct or otherwise, between psi and space . . . for a more advanced stage of psi research." With regard to ESP and time, the evidence for precognition, though not yet wholly conclusive, indicates that here too ESP is nonphysical, and other pieces of evidence are added to the argument that psi is not limited by the world of matter. Though psi is nonphysical, it clearly interacts with the physical world, both in ESP and PK, and this interaction that "makes the demonstration of

psi possible shows at the same time that . . . there must be a fundamental unifying principle." In another chapter, "The Psychology of Psi," the relation is examined between psi and mental states, intelligence, sex, age, and so on. Negative deviations, referred to as "psi-missing" effects, have been found in ESP experiments in which the purpose was to correlate the subject's psychological traits and attitudes with his ESP scores. The indications are that those who enjoy and accept the experimental situation score positively, whereas those who have an antipathy toward it produce scores below chance expectation. Here, psi is apparently affected by the same kind of conditions as those influencing ordinary perception and behavior. But it is emphasized that the tests in question have not shown the existence of any trait or attitude associated with the degree of evidence of ESP. They do not tell who is likely to show much evidence of ESP and who less, but only whether the scores are apt to be below or above chance. However, the authors are convinced that the extent of the subject's motivation in the test influences the amount of psi observed. If an experimenter is able to stimulate interest and enthusiasm in his subject (e.g., by "rewards or prizes adapted to the subject's age and interest"), he is likely to stimulate significant ESP scores, whether above or below the chance line. In the chapter entitled "Psi Research and Other Related Fields," the practical application of parapsychical abilities is first discussed. Special mention is made of dowsing, to which some experimental evidence lends support. This is followed by a section devoted to psychiatry in which reference is made to the publications in recent years about ESP in the psychoanalytic situation. ESP testing in mental hospitals is also brought up, but it is observed that the efforts have been too few and scattered to give a clear picture of how the patients tested performed in comparison with the normal population. The relation of psi to education is taken up in a discussion of van Busschbach's ESP school research and its continuation by Anderson and White. In connection with anthropology, experiments are reviewed which follow up the anecdotal accounts of psi occurrences brought home by anthropologists from their forays to primitive societies.

The authors point out that the work indicating ESP ability in various animal species should open up wider collaboration between biology and parapsychology. Physiological explorations in para-

psychology, including work with the electroencephalogram and the psychogalvanometer, are also mentioned, and reference is made to ESP testing of subjects recovering from childbirth, concussion, and so on. The experiments are all of an exploratory nature and it is noted that the correlations found may be due to the psychological state associated with the physiological condition, rather than with the latter as such.

The authors next survey the areas where psi touches on the science of medicine. There is a brief examination of the exploratory researches in which successful results were reported by experimenters trying to influence the swimming direction of paramecia, the rate of growth of bacteria, and the rate of germination of spores and seeds. If any factual foundation is found in the claims of unorthodox healers, beyond the influence of suggestion or familiar factors, it is proposed that the cures may involve a PK effect of the type already experimentally studied.

The prospects are considered that parapsychology may come to have an important bearing on religious problems. By confirming the presence of nonphysical factors in human beings, parapsychology has furnished empirical evidence in support of a basic aspect of religious beliefs. With regard to the special problem as to whether a nonphysical element of human nature survives bodily death, we have as yet no conclusive empirical proof. The evidence from mediumistic research, though offering reasonably good indication that information has been obtained by parapsychical processes, has not revealed whether or not it is of discarnate origin or collected by the medium himself relying only on his own ESP powers.

In a final section dealing with philosophy and psi, the authors propose that parapsychology has aided philosophy in the exploration of the mind-body problem by having demonstrated that psi, a nonphysical function, actively interacts with the physical environment. This interaction hints that "the contrast between the physical and nonphysical, while very important and full of meaning for psychology and related fields, cannot be regarded as more than a relative one." But there are cases, precognition being one, where parapsychology needs the help of philosophy to help clarify the problems and indicate the answers.

Throughout these pages the authors impress on their reader that

the areas where parapsychology blends with other fields of human endeavor may be the most fertile for concerted research. Psi does not operate in a vacuum, but as part of the world we know. To reach the point where psi effects can be measured and collected at will, parapsychologists must draw on knowledge collected in other fields. Conversely, the seeds of this new science are likely to scatter far beyond its borders. The significance of the phenomena has for long been realized by the more open and agile philosophical and religious minds, and there are now also indications that inroads are being made to other parts of the academic and professional communities. These indications will be apparent when the reader turns to the list of significant events in parapsychology at the end of the book—a list to which the publication of this first textbook in the field should be added.

W. G. Roll

Proceedings of Four Conferences of Parapsychological Studies. New York: Parapsychology Foundation, Inc., 1957.

This volume contains the summaries of some sixty papers from four specialized conferences which the Parapsychology Foundation has sponsored since 1953, when it was host to the International Conference of Parapsychological Studies in Holland. The four conferences dealt, respectively, with philosophical aspects of parapsychology, unorthodox healing, spontaneous phenomena, and the relation of psychology to psi.

A good many of the names which appear in the list of contents will not be found among the contributors to parapsychological journals. They belong to representatives, often distinguished, of other branches of study who, we may suppose, were invited for the prestige their friendship might lend the field and for the approaches they might inspire to the parapsychological problems and achievements presented by their codelegates. The most fruitful basis of participation for such friendly migrants would be for them to take part in discussions of the papers presented by parapsychologists (as was done at the Ciba Foundation symposium). Their lack of familiarity may then have the virtue of lending freshness to the discussions, tempered and directed by their professional training. But they cannot be expected always to make worthwhile contributions if

they themelves are asked to submit serious parapsychological papers, as they were at these conferences.

Undoubtedly some of the papers also suffered by their drastic condensation. This review, however, will deal only with those which in their present form appear to be of interest to parapsychologists.

The "International Philosophic Symposium" was held at St. Paul de Vence, Southern France, in 1954. Prof. C. J. Ducasse's introduction to the papers is followed by an appeal by Prof. H. H. Price for a terminology which will unify psi phenomena and integrate them with what we know of the rest of nature. In this work, he says, we must surrender the materialistic conception of personality which has been instilled in us by Western education, but at the same time retain the use of present-day scientific method.

Precognition remains the Gordian knot of philosophical parapsychology. Thus, Mrs. Martha Kneale finds that present theories range between the unintelligible and the implausible. Information about the future can be achieved either directly or indirectly, she says. If the former, then some sort of multi-dimensional theory of time is required, and this, when worked out, is unintelligible. For instance, Dunne's theory involves an infinite regress, a philosophical flaw which is due to "the assignment of a mathematical meaning to the strictly colloquial and non-mathematical metaphor that it takes time to traverse time." The second type of theory she refers to as the "calculating boy" or "unconscious inference" theory. Because this theory requires such a vast amount of information about present facts in order to account for precognitions, she finds it highly implausible. It may become somewhat more plausible, she suggests, if we assume a "coalescence" of minds to work out the inferences. In the course of summarizing Mrs. Kneale's paper and the discussion about precognition, Prof. C. W. K. Mundle paraphrases her as having also proposed that the group mind might influence the bodily behavior of those forming the group and might effect the movement of physical objects by PK so as to verify the precognitions. Mundle also refers to Dr. Jule Eisenbud's suggestion that people's destructive desires may (presumably by PK) fulfill their forebodings.

Prof. C. J. Ducasse sets out to clarify the body-mind problem in order to determine the logical status of the survival hypothesis. His

neat distinction between the material and the mental may be worth quoting. "The 'material' world . . . comprises all the things, events, states, and processes, that are perceptually public; and also their minute constituents which are not perceptible but are indirectly discoverable by scientific induction. 'Mental,' on the other hand, is the name applied to the things, events, states, and processes that only introspection directly reveals; and also to the subconscious ones, which elude introspective observation but are indirectly discoverable by scientific induction." Ducasse goes on to examine different types of causal capacities which he says are characteristic of mental and material substances. There are four: namely, physico-physical (e.g., chemical solubility), physical-psychical (e.g., visibility), psychico-physical (e.g., capacity for voluntary movement), and psychico-psychical (e.g., associations of ideas). The first three capacities are associated with the brain, the last three with the mind in a living body. At death the mind loses the possibility of exercising two of these causal capacities, but no contradiction is involved in advancing the survival hypothesis, and to propose that the mind continues exercising its psychico-psychical abilities.

When it comes to the question as to what type of survival is most likely, Prof. Price says that personal identity after death (and therefore survival) may be a matter of degree, as some haunting and mediumistic occurrences suggest. He finds that the most intelligible kind of next world is a world of mental images, a kind of dream world in which social relations are by telepathic interaction with like-minded personalities. Mr. Aldous Huxley's suggestion in his paper that mescaline visions are perhaps "a foretaste of what shall come after the moment of death" is of interest in this context.

Papers were also presented by Jean Gebser, Prof. Pascual Jordan, Gabriel Marcel, Prof. Denis Saurat, Dr. J. R. Smythies and Prof. Aloys Wenzl.

The philosophical conference was followed, during the same month, at the same place, by the "International Study Group on Unorthodox Healing." In his introduction to the papers, Dr. Jule Eisenbud observes that if there is such a thing as parapsychological influence on bodily states, perhaps this influence also operates in the direction of disease. He emphasizes the need to study the prob-

lem of verifiability of the data and to make clear in which respect a case of paranormal healing comes under parapsychology rather than, for instance, under psychosomatic medicine. Dr. R. H. Thouless makes the same point when he notes that suggestion and normal processes may enter into paranormal healing. The problem, Thouless says, may be solved by an experiment: several pairs of patients with similar disorders should be selected by a hospital. One of each pair of patients should be chosen as the subject for parapsychical healing and the other should receive no treatment. The hospital must not know who has been selected. At the end of the healing attempts, a standard statistical evaluation of the results could be made. Dr. Hans Bender has a similar procedure for determining the success of parapsychical diagnosis.

Several delegates urged the use of psychological tests. Ulrich Moser suggests the use of Szondi's "Fate-analysis," whereas Dr. D. J. van Lennep thinks that we should develop psychological tests especially designed for the study of parapsychical healing. Ordinary psychological tests might not suffice "since they are designed to screen individuals as to definite demands made by society." Instead, he suggests that we should study the attitude of the patient to his body, the meaning of illness to healer and patient, and the social relationships of both. Dr. Emilio Servadio emphasizes that we should not consider the patient in isolation, but should study the interpersonal situation of healer-patient.

Prof. L. Beirnaert draws attention to the fact that a shift of symptoms from somatic to psychic may take the place of actual cure (i.e., disappearance of symptoms) and be mistaken for such. He also points out that our absolute concept of being "sick" and "healed" should take into account the relation of man with his social environment as well as the actual condition of his physical organism. Mrs. Eileen J. Garrett says it may be important to change the environment of the patient to secure a lasting effect.

The article by Francois Leuret discusses the Lourdes Medical Bureau of which he was Director. The purpose of the Bureau is to examine alleged miraculous cures. Leuret explains that studies are made of the cases before, during, and after the pilgrimage. If a cure is acknowledged as having no natural explanation it is forwarded to the theological commissions. After the exclusion of

frauds, mental cases, and cases for which there is insufficient evidence, there remain forty-nine miracles which have been acknowledged to date. But the Bureau makes no further study of these occurrences inasmuch as they are believed to be caused by interruptions of the laws of nature by God and as such are not considered part of natural science. Prof. Heinrich Meng also has a paper devoted to Lourdes. He emphasizes that the mental expectations, faith, and other emotions engendered by the shrine may be a factor in the cure.

Dr. Alain Assailly was not concerned with healing as such. His paper was a report of medical examinations of forty-three women with psi abilities who were found to be deviate in several respects from the norm.

The delegates were also addressed by Dr. Gotthard Booth, Hubert Larcher, K. Saller, and Dr. J. R. Smythies.

The "Conference on Spontaneous Phenomena" held in Cambridge, England, in 1955, was organized by the Society for Psychical Research, London, in co-operation with the Parapsychology Foundation.

Profs. C. J. Ducasse, Gardner Murphy, H. H. Price, and Mr. W. H. Salter are concerned with the methodology of spontaneous case-work. Ducasse stresses that recording should be prompt, precise, and corroborated, and that investigators must be familiar with possible normal explanations and aware that the psychological attitude of the observer may influence the phenomena. Murphy and Salter propose that once we are satisfied that a normal explanation will not suffice, we must make detailed studies of the type of experience had by the person in question and of the situation from which the impressions derive. Murphy thinks that for this purpose we must use the best personality tests available, whereas Salter observes that spontaneous cases are themselves the best contribution to a study of personality. In order to use to advantage the few spontaneous cases that are reported every year, Murphy advocates international collaboration in this work, and Price, an improvement in our "public relations" so that more cases will be reported. (The resolutions passed at the end of the conference reflect both proposals.)

Mrs. K. M. Goldney gives a summary of her researches for the

S.P.R. into alleged poltergeist cases. The phenomena, she concludes, were due either to conscious or unconscious fraud or to misinterpreted physical effects. None of them stood up to careful study. Mr. G. W. Lambert arrives at just this latter kind of proposal in his "hydro-geological" theory of poltergeist phenomena, as his hypothesis is aptly coined in the editorial foreword. An examination of about seventy poltergeist cases, he says, suggests that subterranean movements of water brought about the disturbances; for he found them to be concentrated in coastal regions and correlated with the amount of rainfall, the state of the tides, and so on. Mrs. Lydia W. Allison, in her review of American poltergeists, says that several of these cases also were near tidal water. She then discusses the psychological and psychoanalytical approach to these types of occurrences and observes that here, as in England, adolescents have been suspected agents of the alleged paranormal effects. Dr. C. A. Meier offers a Jungian approach to spontaneous phenomena. Behind most of them an Archetype is constellated and when emotional tension is created (say, by premonition of death) external events may complete the pattern, with the result that a parapsychical event is observed. Dr. Emilio Servadio relates a telepathic dream to illustrate the theme that such cases are much less "spontaneous" than they appear. He proposes that they are motivated by the interpersonal relations of the participants and emphasizes the importance of "transference" and "counter-transference."

Prof. F. J. M. Stratton gives an account of a house in Cambridge with a fifty-year history of haunting. He points to the need of keeping files on repetitive haunts and not publishing them until the phenomena have ceased, so that spurious phenomena are not produced by expectancy. Prof. Hornell Hart compares apparitions of the dead with apparitions which are due to "ESP projection" by living persons. He argues that the latter "constitute separability of the conscious personality from the physical brain." Moreover, he finds that apparitions of the living and the dead are essentially similar and that these latter are also "vehicles of memory and purpose."

Dr. Louisa E. Rhine notes that one of the main difficulties in achieving control over psi is due to the inability of subjects to identify correct impressions. Here spontaneous cases present a different picture: in almost half the cases she examined, the persons felt con-

vinced that their experience had a psi origin. But it remains a problem what this conviction is based on, for evidently the experience itself, whether intuitive, hallucinatory, etc., is "only the psychological mechanism by which information secured by psi happens to be experienced." Another survey made by Dr. Rhine which was concerned with a form of auditory hallucination indicated that the experience is projected by the percipient and not caused by the agent.

Dr. J. B. Rhine shows that the distinction between spontaneous and experimental phenomena is of limited value, since even in controlled experiments psi is still largely spontaneous. He divides psi phenomena into four types: (1) simple, non-recurring spontaneous cases (e.g., telepathic dreams); (2) recurrent spontaneous effects (e.g., hauntings, poltergeists); (3) psi practices and performances which are recurrent *and* solicited (e.g., dowsing, mediumship, healing); and (4) experimental psi effects which are also recurrent and solicited. A reliable answer to our problems, he says, can be provided only by experimental cases, but cases belonging to the other categories may be of great value in suggesting new approaches to experimental work.

Price points out that experimental conditions can be approached in the study of (recurrent) poltergeist and apparitional phenomena. He also notes that even in laboratory research we have to rely on human testimony (regarding experimental findings). So also here the distinction between experimental and spontaneous is not very useful.

An "International Symposium on Psychology and Parapsychology," organized by Mr. Robert Amadou and Dr. Emilio Servadio in collaboration with the Parapsychology Foundation, was held near Paris in 1956.

The introduction to the articles in this section of the book is by Amadou. Prof. L. Delpech discusses the attitude of those critical of paranormal phenomena, but points out that there are also "tendencies towards a naïve, rather lyrical, credulity." He finds that different conceptions of the universe (revealed by psychological tests) are associated with different attitudes to psi. Dr. Jule Eisenbud examines the problem of selectivity in the study of spontaneous cases, among which he includes ESP occurring in the psychoanalytic set-

ting. In experimental work, he says, "the rules for establishing a correspondence are laid down mathematically at the start," but spontaneous cases are only selected on the basis of the correspondences themselves.

Dr. David Kahn contends that the concepts whereby psi phenomena are described often include unproved assumptions which may be false—notably that telepathy is a response of percipient to agent and that ESP is a kind of perceptual process. He offers the alternative hypothesis "that psi may be a phenomenon occurring most commonly within the realm of affect, and here it may be operating continually, with occasional cognitive manifestations appearing in the cloak of a perceptual-like experience." He urges that we explicitly state our theories about psi and then put them to test.

Dr. D. J. West has a report on his and Mr. G. W. Fisk's experiment on ESP and mood. It was a group test with clock cards assessed by the "majority vote" analysis and about 160 subjects took part. The results are statistically significant and show a relationship between pleasurable moods and positive ESP scores and between unpleasurable moods and negative ESP scores.

Though Dr. Jan Ehrenwald is of the opinion that the basic tenets of Freud and Jung are valid, he gives the psychoanalytic couch a jolt by saying that the theories of the therapist may telepathically influence the mind of the patient, "seemingly confirming the therapist's pet scientific hypothesis."

Dr. C. A. Meier believes that we must revise the concepts of transference and projection in terms of a Jungian "constellating factor" or "Archetype" which encompasses the individuals and objects concerned and which may give rise to "acausal" or "synchronistic" events (i.e., psi phenomena). Dr. Emilio Servadio similarly says we must be on the look-out for emotional links between people, the "dove-tailing" of their emotional patterns, as well as for physiological and psychological factors which create a need for telepathic communication. Also he proposes that behind "psi causality" there is a noncausal connection of the type Jung advances.

Mr. Robert Amadou suggests that now that we have isolated psi through experiment and proved its existence, we must observe it in its psychological, physiological, and cultural contexts to find its normal functions. When it is a matter of studying psi in non-

Western societies, Pierre Barrucand thinks we should avoid "objective tests" and instead observe the phenomena in their cultural setting. We should concentrate on the means of acquiring paranormal abilities through initiation procedures but be careful to distinguish methods of practical development of psi abilities from conventional teachings and rituals. Conversely, Prof. Ernesto de Martino maintains that it is impossible to carry out a proper study of the magic or the religious ideology of primitive societies if we are ignorant of the reality of parapsychical phenomena.

Several delegates urged close collaboration with physiology and neurophysiology. Dr. Alain Assailly refers to some poltergeist cases which were apparently brought about by a joint action of adolescents and middle-aged persons. He notes that young people are often dominated by middle-aged persons and that there is a similarity between some of the hormone glands during prepuberty and the climactic stage. He also suggests that the hormone which stimulates the activity of the thyroid gland may be associated with psi. Dr. Jean Bruno believes that yoga offers parapsychology "unsuspected experimental possibilities, especially on the physiological level," and Prof. Marcel Martiny thinks that parapsychology should pay more attention to cerebral mechanisms. He points out that prior to an epileptic fit, the patient may have experiences which closely resemble those associated with certain psi occurrences.

There were also contributions by Prof. Jean Lhermitte, The Rev. Father Reginald Omez, and Dr. Jean Servier, and a number of resolutions were passed with a view to promoting the investigation of spontaneous and psychoanalytic cases and encouraging collaboration with cultural anthropology, physiology, psychology, and physics.

W. G. Roll

Eleven Lourdes Miracles, by D. J. West. London: Gerald Duckworth, 1957. x + 134 pp.

Medical cures have been reported in connection with visits to Lourdes for about one hundred years. In spite of a voluminous literature pro and con regarding whether certain of these cures are "miraculous," there is still a tremendous amount of doubt that "miracle" cures occur. Indeed, Dr. West's *Eleven Lourdes Miracles*,

amply demonstrates how difficult it is to come to any conclusion since, in the overwhelming majority of cases, even the bare medical facts themselves are not clear. Dr. West has selected eleven cases admitted by the ecclesiastical authorities as "miraculous" which occurred over the years 1937 to 1950. Presumably these cases should represent the best documented evidence concerning the diagnosis and the course of the illness. Yet in all eleven cases Dr. West shows that evidence either of the diagnosis or progress of the disease is deficient at some point vital to the judgment of the entire case. At least this is how it appears to the author, an interested medical observer, who has taken considerable trouble to examine the original evidence on which the judgment of "miraculous cure" was based.

Although only those with a medical background can appreciate the fine points of Dr. West's book, a lay reader with an interest in faith healing will find in it a readable model of a good objective study of very contentious subject matter. The first and last chapters especially focus well on the task of objectively dealing with faith healing or miracle cures and do not require a medical background to be appreciated.

After reading this study one is amazed at the amount of effort which goes into the documentation of each case, but even more striking is the humbling realization that even if the case study method were to yield unequivocal medical facts, *no exact* conclusions would be possible since one does not have any comparable group of "control" patients. This is a cogent argument in favor of controlled clinical or laboratory studies of miracle healing. If one's religious beliefs and feelings do enter into the healing process, it is certainly possible to design suitable tests to outline the psychological, parapsychological, and physical effects of such beliefs on diseases.

If Dr. West's book will stimulate researchers to make good controlled studies of faith healing, it will have served very well a most positive purpose although its general conclusion is not favorable to faith healing.

REMI J. CADORET

TRAITÉ DE PARAPSYCHOLOGIE, by René Sudre. Paris: Payot, 1956. 493 pp.

To those for whom the transition in parapsychology of recent years has been too rapid and the shift of emphasis too sudden, this treatise on parapsychology will be welcome and reassuring. Mr. Sudre was a researcher in parapsychology when most of those active in the field today were just beginning.

He brings to his review a great deal that is not to be found in most of the current books on the subject. For his historic review he goes back to Mesmer and the development of hypnotism. In outlining the field he ranges out into psychological states of trance, multiple personality, and automatisms and cuts a wide swath of occult, mystical, and spiritualistic subject matter including the claims of human radiation, teleplasm, hauntings, and levitation. The spirit hypothesis has a series of chapters as well.

But the more experimental studies of telepathy, clairvoyance, precognition and psychokinesis do have their place, modest though it be, in this broad survey. Although they are "not so important for the advancement of our science," Sudre says, the experimental studies are important in order to convince the "men of science who, victims of their education, trust only repeatable facts. . ."

The final section is devoted to theories, with a culminating chapter "L'Esprit dans la Nature," in which Sudre attempts to integrate parapsychological phenomena (including the claims of what are now called psi capacities in animals) with general biology and with the philosophy of evolution.

If trends mean anything, this may be the last representation of an old school, and a brave attempt to meet and adjust to the newer developments which that school helped to bring about. The new students of parapsychology today would, however, find this broader picture interesting and informative, even if much of it had to be looked upon with new reservations and reappraisals.

WADIH SALEH

ANNOUNCEMENT OF FORMATION OF THE PARAPSYCHOLOGICAL ASSOCIATION

On June 19, 1957, a professional parapsychological society was formed at Duke University. The purpose of this organization is to advance parapsychology as a science by serving as an international meeting ground for those actively engaged in research in this field.

At the organizational meeting a Founding Council of seven was elected to serve until a constitution had been adopted and regular elections by the voting members had been initiated. The officers are: President, Robert A. McConnell, University of Pittsburgh; Vice-President, Gertrude R. Schmeidler, City College of New York; Secretary, Rhea White, Duke University; Treasurer, Remi J. Cadoret, Duke University; Councilmen: Karlis Osis, Parapsychology Foundation, New York, Margaret Anderson, Duke University, and W. G. Roll, Oxford University.

There are two classes of membership: Members and Associates. The qualifications for each as laid down in the Constitution are as follows:

> A Member shall be a person: (a) who is or has been engaged in the advancement of parapsychology as a science; and (b) who has prepared a paper on some aspect of parapsychology which, in the opinion of the Council, is of high professional calibre, and which has been published in a scientific journal or which merits such publication; and (c) who has a doctorate degree from a university of recognized standing or has a professional affiliation with a recognized academic institution or research organization or who has been nominated by three members of the Council; and (d) who has been nominated by two Members of the Association; this requirement is fulfilled by a person who satisfies the third alternative requirement of (c); and (e) who has been elected by a vote of five members of the Council.
>
> An Associate shall be a person: (a) who is engaged in the advancement of parapsychology as a science; and (b) who has graduated from a university of recognized standing or has a professional affiliation with a recognized academic institution or research organization or who has been nominated by three members of the Council; and (c) who has been nominated by two Members of the Association; this requirement is fulfilled by a person who satisfies the third alternative requirement of (b); and (d) who has been elected by a vote of five members of the Council.

The Council believes that this organization will meet the needs of professional workers in parapsychology by facilitating personal contacts and the communication of research findings. It plans to hold an annual convention (beginning in 1958) and will try in other ways to assist the exchange of information and to initiate new researches. It will collaborate in all ways possible with existing psychical research societies.

The *Journal of Parapsychology* is affiliated with the Association, and Members and Associates will receive a subscription to the *Journal*. Dues for Members and Associates residing in the U. S. A. are $10.00 and $6.00, respectively, per annum. For those living outside the U. S. A., the fees are reduced to $6.00 and $5.00. Also, fees are reduced fifty per cent for one member of a married couple, if they both become Members or Associates but wish to receive only one copy of the *Journal of Parapsychology*.

Readers of this *Journal* who desire to become affiliated with the Association are invited to write, stating their qualifications, to the Chairman of the Membership Committee, Dr. Gertrude R. Schmeidler, 17 Kent Avenue, Hastings-on-Hudson, New York.

GLOSSARY

A description of the basic experimental methods, of the findings, and of the statistical procedures for evaluating ESP and PK results may be found in *Parapsychology, Frontier Science of the Mind* by J. B. Rhine and J. G. Pratt (published by Charles C. Thomas, Springfield, Illinois, U.S.A., Blackwell Scientific Publications, Ltd., Oxford, England, and The Ryerson Press, Toronto, Canada).

AGENT: The "sender" in tests for telepathy, the person whose mental states are to be apprehended by the percipient. In GESP tests, the person who looks at the stimulus object.

BT (Basic Technique): The clairvoyance technique in which each card is laid aside by the experimenter as it is called by the subject. The check-up is made at the end of the run.

CALL: The ESP symbol selected by the subject in trying to identify a target.

CHANCE: The complex of undefined causal factors irrelevant to the purpose at hand.

Chance Expectation = Mean Chance Expectation: The most likely score if only chance variation is present.

Chance Average: Mean chance expectation expressed as an expected score, generally in terms of average per run.

CHI SQUARE: A sum of quantities each of which is a deviation squared divided by an expected value. Also a sum of the squares of CR's.

CLAIRVOYANCE: Extrasensory perception of objective events as distinguished from telepathic cognition of the mental activities of another person.

CR (Critical Ratio): A measure to determine whether or not the observed deviation is significantly greater than the expected random fluctuation about the average. The CR is obtained by dividing the observed deviation by the standard deviation. (The probability of a given CR may be obtained by consulting tables of the probability integral, such as Pearsons.)

CR_d (Critical Ratio of the Difference): The observed difference between the average scores of two samples of data divided by the standard deviation of the difference.

DEVIATION: The amount an observed number of hits or an average score varies from the mean chance expectation or chance average. A deviation may be total (for a series of runs) or average (per run).

DISPLACEMENT: ESP responses to targets other than those for which the calls were intended.

Backward Displacement: ESP responses to targets preceding the intended targets. Displacement to the targets one, two, three, etc. places preceding the intended target are designated as (—1), (—2), (—3), etc.

Forward Displacement: ESP responses to targets coming later than the intended targets. Displacement to the targets one, two, three, etc. places after the intended target are designated as (+1), (+2), (+3), etc.

DT (Down Through): The clairvoyance technique in which the cards are called down through the pack before any are removed or checked.

ESP (Extrasensory Perception): Awareness of or response to an external event or influence not apprehended by sensory means.

ESP CARDS: Cards, each bearing one of the following five symbols: star, circle, square, cross and waves (three parallel wavy lines).

ESP PACK: Twenty-five ESP cards.

Closed Pack: An ESP pack composed of five each of the five symbols.

Open Pack: An ESP pack made up of the ESP symbols selected in random order.

EXPECTATION: See *Chance.*

EXTRACHANCE: Not due to chance alone.

FREE MATERIAL: The stimulus objects of experiments in which an unlimited or unspecified range of stimulus objects is employed (as contrasted with methods such as card-calling in which the subject knows that the stimulus object is one of a known range).

GESP (General Extrasensory Perception): A technique designed to test the occurrence of extrasensory perception, permitting either telepathy or clairvoyance or both to operate.

MCE (Mean Chance Expectation): see *Chance.*

P (Probability): A mathematical estimate of the expected relative frequency of a given event if chance alone were operative.

PARAPSYCHOLOGY: A division of psychology dealing with behavioral or personal effects that are demonstrably nonphysical (that is, which do not fall within the scope of known physical principles).

PERCIPIENT = SUBJECT: The person who makes the calls in an ESP test.

PK (Psychokinesis): The direct influence exerted on a physical system by a subject without any known intermediate physical energy or instrumentation.

PLACEMENT TEST: A PK technique in which the aim of the subject is to try to influence falling objects to come to rest in a designated part of the throwing surface.

PRECOGNITION: Cognition of a future event which could not be known through rational inference.

PREFERENTIAL MATCHING: A method of scoring responses to free material. A judge ranks the stimulus objects (usually pictures in sets of four) with respect to their similarity to, or association with, each response; and/or he ranks the responses with respect to their similarity to, or association with, each stimulus object.

PSI: A general term to identify personal factors or processes which are nonphysical in nature. It approximates the popular use of the word "psychic" and the technical one, "parapsychical."

PSI-MISSING: Exercise of psi ability in a way that avoids the target the subject is attempting to hit.

PSI PHENOMENA: Occurrences which result from the operation of psi. They include the phenomena of both ESP (including precognition) and PK.

PSYCHICAL RESEARCH: Older term used for parapsychology.

QD (Quarter Distribution): The distribution of hits in the record page (or in a logical subdivision thereof, such as the set or the half-set) as found in the four equal quarters formed by dividing the selected unit horizontally and vertically.

RANDOM ORDER: An order of events which displays no trends or regularities that would allow any inference regarding one event from one or more of the others in the series.

RUN: A group of trials, usually the successive calling of a deck of 25 ESP cards or symbols. In PK tests, 24 single die throws regardless of the number of dice thrown at the same time.

SCORE: The number of hits made in any given unit of trials.
Total Score: Total of scores made in a given number of runs.
Average Score: Total score divided by number of runs.

SD (Standard Deviation): Usually the theoretical root mean square of the deviations. It is obtained from the formula $\sqrt{npq}$ in which n is the number of single trials, p the probability of success per trial, and q the probability of failure.

SERIES: Several runs or experimental sessions that are grouped in accordance with a stated principle.

SESSION: A unit of an ESP or PK experiment comprising all the trials of one test occasion.

SET: A subdivision of the record page serving as a scoring unit for a consecutive group of trials, usually for the same target.

SIGNIFICANCE: A numerical result is significant when it equals or surpasses some criterion of degree of chance improbability. The criterion commonly used in parapsychology today is a probability value of .01 or less, or a duration in either direction such that the CR is 2.58 or greater.

SINGLES TEST: A PK technique in which the aim of the subject is to try to influence dice to fall with a specified face up.

SPONTANEOUS PSI EXPERIENCE: Natural, unplanned occurrence of an event or experience that seems to involve parapsychical ability.

STIMULUS OBJECT: The ESP card or drawing or other object, some identifying characteristic of which is to be apprehended by the percipient.

STM (Screened Touch Matching): An ESP card test in which the subject indicates in each trial (by pointing to one of five key positions) what he thinks the top card is in the inverted pack held by the experimenter behind a screen. The card is then laid opposite that position.

SUBJECT: The person who is experimented upon. In ESP tests, most commonly the percipient (though also the agent in GESP and telepathy). In PK tests, any individual whose task it is to influence the objects thrown.

TARGET: In ESP (including precognition) the objective or mental events the subject is attempting to respond to. In PK tests, the faces of the die which the subject attempts to bring up in the act of throwing. In placement tests, the designated part of the throwing surface.

Target Card: The card which the percipient is attempting to identify or otherwise indicate a knowledge of.

Target Pack: The pack of cards the order of which the subject is attempting to identify.

Target Face: The face on the die which the subject tries to turn up by PK.

TELEPATHY: Extrasensory perception of the mental activities of another person (as distinguished from clairvoyant cognition of objective events).

TRIAL: In ESP tests, a single attempt to identify a stimulus object. In PK tests, a single throw of the dice or other objects thrown.

HERE AND THERE IN THE LITERATURE

If the ingrained beliefs and attitudes of the modern world have somehow kept scientists from new and radical approaches to the problem of cancer, then it would follow that what we are waiting for is another Darwin or Pasteur. No doubt it is believed by those responsible for the current "crash program" in cancer research that larger expenditures of research funds will hasten the day when the lightning strike of genius will flash across the sky. On this day, it is thought, a Darwin or a Pasteur—perhaps yet unborn—will perform the crucial experiment or, in an inexplicable moment of deep insight, he will perceive a fallacy that a generation overlooked.

This sort of thing is going on today. Evidence has been presented, for example, that, on the face of it, seems capable of explanation only if . . . telepathy or extrasensory perception exists. Most scientists reject this explanation, yet a few daring individuals have concluded that ESP does exist and have accepted all the implications of this belief, among which is the view that telepathic waves pass between individuals that cannot be obstructed by physical barriers and cannot be detected by any manner of radiation detector. The doubters, recognizing that such a phenomenon is completely incompatible with modern physics and conceding that all of physics just *might* be wrong, nevertheless prefer to believe that the evidence is defective, either through error or—let's face it—through fraud, since to them it seems that, in this neurotic age, there is a higher probability that fraudulent or erroneous evidence has been produced than that all the laws of physics are invalid. And there the question stands, as the world awaits the incontrovertible experiment which will prove that ESP exists.

From *Modern Science and the Nature of Life* by William S. Beck
(Harcourt, Brace and Co.)